

## **Palestine's Economic Future**



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# Palestine's

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*Edited by J B Hobman*

# **Economic Future**

a review of progress and prospects

with a message from Field Marshal Smuts

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# Table of Contents

	PAGE
<b>Editorial Note.</b> <i>J. B. Hobman.</i> Ed David Eder, Memoirs of a Modern Pioneer, 1945	9
<b>Introduction</b> <i>Dr. Chaim Weizmann,</i> B Sc , Sc D . L L D. President of World Zionist Organization and Jewish Agency for Palestine	11
<b>Palestine: A Promise for the Middle East</b> <i>Walter C. Lowdermilk.</i> Assistant Chief of Soil Conservation Service, U S A , Author of <i>Palestine, Land of Promise</i>	15
<b>Palestine's Economic Possibilities</b> <i>Robert R. Nathan,</i> B Sc , M A , LL B Economic Consultant, Assistant Director (Research) U S A National Defence Advisory Commission (1940), Chairman, Planning Committee War Production Board (1942), Deputy Director for Reconversion (Demobilisation) (1945), Author of <i>Mobilising for Abundance</i>	29
<b>Palestine: The Economic Aspect</b> <i>Harold J. Laski.</i> Professor of Political Science, London University, Author of <i>Liberty in the Modern State, Reflections on the Revolution in our Time, etc.</i>	34
<b>Jewish Palestine: The Social Fabric</b> <i>Ephraim Broido.</i> Member of editorial board <i>Davar</i> , Palestine, Author of <i>Jews, Arabs, and the Middle East</i> (London. 1944)	43
<b>Arab Economy in Palestine</b> <i>David Horowitz.</i> Co-Director of the Economic Research Institute of the Jewish Agency for Palestine	55
<b>Palestine and the Economic Development of the Middle East</b> <i>Albert Dorra.</i> Consulting Engineer, Alexandria, Egypt	98
<b>The Supply of Capital</b> <i>S. Hoofien,</i> M B E General Manager Anglo-Palestine Bank, Chairman and Managing Director General Mortgage Bank of Palestine	105
<b>Private and Public Investment in the Jewish National Home</b> <i>Eliezer Kaplan.</i> Member of the Executive and Treasurer to the Jewish Agency for Palestine	112
<b>Aspects of Palestine Agriculture</b> <i>Sir E. John Russell,</i> F.R S , D Sc. Director Rothamstead Land Experimental Station (1912-43), Harpenden, Chairman of Agricultural Sub-Committee of U.N R R.A.; Author of <i>Fertility of the Soil, English Farming, etc.</i>	116
<b>Utilization of Agricultural Products</b> <i>Ernst Bergmann.</i> Member of Daniel Sieff Research Institute, Rehovoth, Palestine, and Assistant to Dr. Weizmann	130
<b>The Dead Sea and the World Potash Industry</b> <i>M. Novomeysky,</i> M I.Chem.I., M.I.M.M. General Director of Palestine Potash Ltd.	137

	PAGE
<b>The Electrification of Palestine</b> <i>Vladimir Luwshutz-Garik.</i> Ph D Econ B Sc Chem Member of Scientific Society of Sigma and American Economic and Chemical Associations	183
<b>Science and Industry in Palestine</b> <i>L. Farkas.</i> Head of Department of Physical Chemistry Hebrew University, Jerusalem	191
<b>War Industries in Palestine</b> <i>C. Wilson Brown,</i> C B E , M C , M Inst C E Director Public Works, Controller of Heavy Industries and Director of War Production, Government of Palestine	200
<b>The Building Industry</b> <i>Arnold Arnstein.</i> Director of Standards Institution, Palestine	216
<b>The Textile Industry</b> <i>E. Moller.</i> Director Kfar Ata Textile Industry	222
<b>The Chemical Industries</b> <i>Ludwig Taub.</i> Member of Daniel Sieff Research Institute	227
<b>The Diamond Industry</b> <i>Yehoshua Mazur.</i> Member of Diamond Control Board, Palestine	229
<b>Precision Instruments Industry</b> <i>Emanuel Goldberg,</i> Ph D Member of Daniel Sieff Research Institute, Rehovoth; formerly Director Zeiss Ikon Co.	238
<b>Printing and Publishing</b> <i>Gustav Schocken.</i> Editor of <i>Haaretz</i> , Palestine daily	244
<b>Insurance Companies</b> <i>E. H. Luft.</i> Manager of "Hassneh" Insurance Co. of Palestine	253
<b>Tourism and Health Resorts</b> <i>Walter Turnowsky.</i> Director "Tour" Palestine Tourist Development Co Ltd., Member of Transport Advisory Board of Palestine Government (1945)	256
<b>The Role of Palestine in Civil Aviation</b> <i>Wing Commander M. M. Kaye,</i> O B E , M A , A.M I Mech I	262
<b>Children and Youth Aliyah</b>	
<b>Editorial</b> <i>J. B. Hobman.</i>	273
<b>Message</b> <i>Field Marshal Smuts.</i> Prime Minister, Union of South Africa	274
<b>The Great Choice</b> <i>Dr. Vera Weizmann.</i> Joint Chairman, Children and Youth Aliyah, and Chairman of Book Committee for <i>Palestine's Economic Future</i>	277
<b>Statement on Youth Aliyah</b> <i>Georg Landauer,</i> Dr of Law, Hon. Treasurer of the Children and Youth Aliyah Organisation in Palestine.	281

# Illustrations

	PAGE		PAGE
Air view Palestine Electric Corporation	14	Reading power house	147
Refugee type Insulin chemist	44	Repairing radio tubes, Hebrew University	148
Refugee type A former bank-clerk	47	University Physical Chemistry Department	149
Refugee type Prague clerk as cosmetic worker	50	University Central Workshop Petrol-air gas burner	149
Refugee type A former art historian	53	Investigating gas reactions	150
Arab wedding costumes The bride's father	57	Casting bathtubs—"Vulcan" Foundry, Haifa	151
Arab harvester as in Bible times	60	Co-operative Foundry in Tel Aviv	152
Arab wedding costumes	65	Cardboard production Petach Tikvah	153
View from the Meteorological Institute (Jerusalem)	66	In a brick factory	153
Citrus terraces (Maale Hachamisha)	67	Making safety-razor blades	154
Landscape near Safed	68	Making vegetable crates Kibbutz Afikim (Jordan Valley)	155
Land settlement (Mishmar Haemek)	69	Tinned fruit and jam production at Givath Chayim	155
Balfour Forest, 1930	70	Police post at Acre	156
Making a settlement, Ramat Naphtali	71	Rockefeller Museum, Jerusalem	156
(a) First wooden shacks		New building for old	157
(b) The site		Planning new suburbs Tel Aviv	157
(c) Reservoir construction		Municipality in the Arab town of Gaza	158
Tnuva Co-operative dairy	72	Citrus House, Tel-Aviv	159
Threshing in youth camp	73	Modern food market, Haifa	159
Agricultural machinery Ilon Settlement, Gahlee	74	Jewish National Museum "Bezalel", Jerusalem	160
Repairing agricultural machinery	75	Statue	161
Students in the ballet	76	Annual fashion exhibition, Tel Aviv	162
A statue of David at Ramath David (named after Lloyd George)	77	Textile exhibits	162
Fighting malaria	78	Hosiery factory	162
In the swamps of Hule	78	Silk products	163
Youth Aliyah boy washing the soil	79	Silk loom (Delfiner)	164
Resting in the shade	80	Spinning section, Kfar Ata	165
Arab fisherman of the Sea of Gahlee	81	Cotton mills in Ramat-Gan, near Tel Aviv	166
Arab children at Jewish Medical Station	82	"Lodzia", hosiery factory	167
Anglo-Palestine Bank, Jerusalem, Banking Hall	83	Spinning section, Kfar Ata	168
Palestine postage stamps	84	Locally-made textile goods at fashion exhibition, Tel Aviv	168
Modern farming in the Plain of Jezreel	85	Teva laboratory (medical plants)	169
Citrus grove and settlement	86	Chemical products	170
Ein Geb fishing collective (on Lake Kinereth)	87	Soap products (Shemen)	171
Watch-tower at Ein Geb	88	Open-air bath, Tiberias	172
Orchard, communal settlement of Chanita	89	The gardens at Tiberias	173
Banana crop at Afikim collective settlement	90	Jerusalem from the east	174
The Assis Palestine Fruit Products Co at Ramath Gan	91	Nazareth	174
Assis fruit products	92	Ruins of Masada fortress	175
Water course	93	Camping on Mount Carmel	176
Dead Sea, North Shore	94	Capernaum	176
Inside Potash Works	95	Mount Tabor	177
New salt pans	96	A coastal vessel off Haifa	178
Salt works, Athlit	97	Haifa Harbour	179
Back view of Anglo-Palestine Bank	111	Jewish coastguard	179
Pattern of soil after rainfall (Negev)	117	S S "Har-Zion", formerly sailing regularly between Haifa and Constanza, sunk by enemy action	180
Settlement of Nahalal	122-123	Jewish training ship, "Rahaf"	180
Fruit settlement in the Negev	126	Young Palestinian in training	181
Potash installations	138	"Victory I" built in Tel Aviv	182
Potash installations	140	"Naaman" Installation at Haifa Bay	186
Potash port	142	Air View, Palestine Electric Corporation	188-189
Workers' settlement at the southern end of the Dead Sea	143	Pharmaceutical Research Institute, Rehovoth	194
Refinery in the south of the Palestine Potash Works	144	Laboratory (medical plants)	195
Potash installations	145	Hebrew University with Old City in the background	198-199
Haifa power house	146		

Making ampullae . . . . .	202	The late Director of Youth Aliyah, Henrietta Szold . . . . .	283
A Jewish tank repair unit . . . . .	204	British police escort for newcomers at Haifa . . . . .	284
Making handles for hoes and shovels . . . . .	205	The late Miss Szold at the Ahava Home near Haifa with the director (Mr. Yashuvi) and three "Teheran boys" . . . . .	285
Manufacturing glassware . . . . .	206	The "Children's Republic" Givath Brenner . . . . .	286
Producing parts for electric installations (1943) . . . . .	210	Youth Aliyah group, Afikim . . . . .	286
Fixing reconditioned motor tyres . . . . .	212	Study group of Yemenite children in the children's village of Meier Shefeya . . . . .	287
Boots for the Palestine Police . . . . .	214	Excursion from Tiberias to Safed by group from Trade School, Yagur . . . . .	288
Arab textile factory in Ramallah near Jerusalem . . . . .	215	Youth camping on Mount Carmel . . . . .	289
Smallholders' water tower . . . . .	217	Youth Aliyah girls mending clothes at Tirat Zvi Settlement . . . . .	290
Modern residence (Weizmann House) . . . . .	218	Little "Teheran girls" with their instructor . . . . .	291
Haifa towards Mount Carmel . . . . .	220-221	Two girls who reached Palestine from Roumania during the war . . . . .	292
Ata Textile Co. (weaving) . . . . .	223	The pleasures of country life . . . . .	293
Textile printing . . . . .	225	Youth Aliyah graduates, students of the Hebrew University, first holders of the Szold scholarship . . . . .	293
Scientific instruments, "Phoenicia", Jerusalem . . . . .	228	Planting a tree in the Henrietta Szold Forest at Maaleh Hachamishah, 1942 . . . . .	294
Diamonds made in Palestine . . . . .	230	Nursing plant in a Negev terrace at Gvuloth . . . . .	295
Diamond workshop at Tel Aviv . . . . .	231	Young shepherd . . . . .	296
Palestine's new diamond industry established at Tel Aviv and Nathania . . . . .	232-233	Girl from Germany at Alonim, a settlement established by Youth Aliyah graduates . . . . .	297
Polishing diamonds . . . . .	234	Youth Aliyah graduate . . . . .	298
Special instrument designed at the Hebrew University . . . . .	235	Watering tomatoes in a Dead Sea settlement . . . . .	299
Working on diamonds at metal disk . . . . .	236	Future farmers training at Meshek Hapoalot . . . . .	300
Refractometer for sugar content of citrus products . . . . .	240	Youth Aliyah . . . . .	301
Microscope for use on machine tool . . . . .	240	Aliyah father (Alonim group) and son . . . . .	302
Testing machine for textile and rubber . . . . .	240	Father (from German Youth Aliyah) and son . . . . .	303
Testing instrument for optical surfaces . . . . .	241	Studying under canvas . . . . .	303
Machine-engraving on microscopic tubes . . . . .	242	Youth Aliyah boy from the Yemen . . . . .	304
Palestinian newspapers and periodicals . . . . .	245	Landscape from children's village, Meier Shefeya, as seen by two little girls from Yemen . . . . .	305
At a Jerusalem Bookshop . . . . .	247	Asluj in the Negev, built by forty Youth Aliyah graduates as an experiment in irrigation . . . . .	306
Street notices in Hebrew . . . . .	248	Vegetable garden in Asluj, irrigated by the scanty waters of a well . . . . .	306
A newspaper stall . . . . .	249	Youth Aliyah girl in Meshek Hapoalot . . . . .	307
Posters . . . . .	250	Student of zoology at Children's Village, Ben Shemen . . . . .	308
Posters in Tel Aviv . . . . .	251	Communal hall at Maabaroith . . . . .	308
Rugged 'landscape' of the Dead Sea . . . . .	258-259	Reading room at Maabaroith . . . . .	309
In Old Jerusalem . . . . .	260	Child from Germany training to become a farmer in Palestine . . . . .	310
St. Catherine's Monastery, Mount Sinai . . . . .	261		
Flying school at Afikim, Jordan Valley . . . . .	254-265		
Arched roof aeroplane hangar of "Nesher" Portland Cement . . . . .	266-267		
Field-Marshal J. C. Smuts, P.C., C.H., D.T.H., LL.D., Prime Minister, Union of South Africa . . . . .	275		
Refugee with the tattooed number of the concentration camp, now a member of Youth Aliyah . . . . .	276		
Orphaned children from Poland who reached Palestine via Russia, Siberia, and Persia in 1944; known as "Teheran Children" . . . . .	278		
The youngest "Teheran Children" . . . . .	279		

## Editorial Note

This book of essays on the economic progress already made in Palestine, and on the possibilities of further expansion, was projected and largely prepared in 1945. The current discussions and negotiations on Palestine, whatever their outcome, do not make a constructive economic survey less timely; indeed, recent developments should make such a survey of more urgent usefulness. "The Jewish National Home, though embodying a minority of the population, is today a reality established under an international guarantee," reports the recent Anglo-American Committee. "It has a right to continued existence, protection and development."<sup>\*</sup>

Zionist progress has been aided by the application of science to agriculture and industry through the Hebrew University in Jerusalem and the Daniel Sieff Research Institute of Rehovoth, and by the development of Dead Sea potash deposits and the grid of Electric Power. Another factor has been the intensive land settlement on a co-operative basis, which the same report called "a miracle both of physical achievement and spiritual endeavour".

Most of the articles of this book are written by experts actually engaged in Palestine in the schemes and industries under review. Other contributors, like Professor Lowdermilk, Sir John Russell, Professor Laski and Mr. Robert Nathan, have special qualifications and sympathies for discussing the larger pattern of future expansion. The "Lowdermilk" hydro-electric plan for turning the Jordan Valley into a source of permanent prosperity for the whole Middle East, was indicated for consideration in Mr. Herbert Morrison's recent statement of British policy; and it is to be found here in full detail.

The recent more rapid pace of economic progress in Palestine has been due partly to the second great world war. It will be seen how fortunate it was for the defence requirements of the United Nations in the Middle East, that Palestine's industries were capable of such increased production and re-adaptation.

Whatever may be the next or final shape of International Trusteeship over Palestine, its future as an economic, ethnological, and geographic bridge between East and West, and as a Jewish National Home, must remain a serious British concern. Thus many different factors give value and interest to this survey of *Palestine's Economic Future* for the specialised or the general reader.

<sup>\*</sup> Cmd 6080, pp. 4.



*Chaim Weizmann*

## **Introduction**

This book on the economy of Palestine attempts to give some idea of its modern agricultural, industrial, and scientific development. It is far from being a complete record. Indeed, it cannot be, since the economy it describes is not static, but dynamic—growing and undergoing constant change in the transition from war to peace. But the essays that follow bear witness to the skill, knowledge and devotion which the Jews have brought to the rebuilding of their land. Such testimony deserves to be widely read, and I am sure that this book will meet with the warm welcome it deserves.

The remarkable transformation wrought in Palestine's economic life in the last two or three decades cannot fail to arouse interest, both for its own sake, and on account of its bearing on the world problem of the Jewish people. The Jews are now passing through one of the most crucial periods in their long and tragic history. Many nations, it is true, have suffered grievously in this war. Now, faced with political uncertainty and sometimes economic ruin, they are surveying their possessions, or what is left of them, and planning their reconstruction. But in no other case has the need for 'reconstruction' a more urgent, a more literal, connotation than in that of the Jews. Six millions—more than three-fifths of European Jewry—have perished: a staggering sum total of disaster, and the greatest yet inflicted on any people as the result of a cold-blooded, scientifically planned, policy. About a million-and-a-half remain in Europe outside Russia—brands plucked from the burning—in many cases the sole survivors of their families. Their possessions have been dispersed, their

economic positions are gone. And although Hitler's armies are defeated, the poison of Nazi racialism is at work to-day in more countries than before. The moral climate in the post-war world does not favour the survival of minority groups, still less of a minority without even the backing of a State of its own. Nor, in most cases, have the remnants of European Jewry the desire or the energy to resume the struggle for existence amidst surroundings and populations that have seen the destruction of everyone and everything they held dear. To-day, practically every European Jew feels in his bones that if his people have suffered as no other, it is because homelessness is the badge of his tribe. Masses of Jews are determined to rid themselves of this curse of homelessness. They have no doubt—as no serious student of history can have—that this is possible only in the land which is theirs by virtue alike of historic right and present achievement. If the pioneers of the Jewish National Movement have made the Jewish National Home 'a going concern,' as the Royal Commission called it, then this was largely due to the spell which that particular country casts over Jewish minds and hearts—something which no other country of colonisation (even were such available) could command. This is the reason why it has been possible in Palestine to create conditions for the absorption of hundreds of thousands of Jewish immigrants with European standards of life, and to raise the level of the Arab population far above that of the neighbouring Arab States. Given large-scale development, very many more could be absorbed and Dr. Lowdermilk, who contributes a notable essay to this book, has shown how it can be done.

Here, as in all such things, the human factor is all-important. Contact with the ancestral soil has had a rejuvenating effect on the Jew, and to-day we find in Palestine a virile, progressive community, the nucleus of a reborn Jewish nation. Their spirit of enterprise, their moral fortitude in face of adversity, as well as their technical and industrial skill, will help the Jews of Palestine to overcome the difficult problems now confronting them.

Palestine is admittedly poor in raw materials, and many people therefore take a gloomy view of its economic future. There is no denying that lack of raw materials is a serious handicap. But other countries, equally 'poverty-stricken' in natural resources, have been able to develop a rich and prosperous agriculture and industry. The classic example is Switzerland, which besides having no raw materials, is also completely land-locked. The key to Switzerland's high standard of life is to be found in her concentration on high quality products, and in the skill and devotion of her people.

Palestine has proved in the last two decades, and more especially in the course of the second world war, that it is capable of becoming the Switzerland of the Middle East. The range of production has expanded under the stimulus of curtailed imports and abundant military contracts. Palestine's industrial output in 1943 was about £36 million, compared with about £10 million in 1939. The greatest development has taken place in the food and metal industries (including machine production), and in the leather and textile industries. Glass, carbonic acid, oxygen, sulphuric acid, pharmaceuticals, precision instruments, brass and steel castings, plastics, as well as artificial teeth and razor-blades, are among the goods now 'made in Palestine.' A diamond-cutting industry has come to stay. The production of super-phosphate fertiliser, so important to agriculture, has rendered Palestine self-sufficient in this field, and even provides a surplus for export to neighbouring countries. The export of potash, bromine, and other by-products derived from the Dead Sea, has been stepped up during the war.

During the war Palestine's Jewish industry has shown such a capacity for adaptation and expansion that the contribution to the war-effort of the 600,000 Jews of Palestine has been proportionately far in excess of that made by greater and richer countries. Therein lies some claim on the attention of those who may be in a position to help Palestinian industry to re-establish itself in the difficult conditions of the post-war world. Inasmuch as the bulk of Palestine's war output was of civilian supplies, the task of 'reconversion' will be easier. But some adjustment in the cost of living, higher labour productivity, technical re-equipment, and a free flow of raw materials, are conditions indispensable for success in the future. An attitude of genuine friendship and readiness to help on the part of the Government—something in the past not always forthcoming—is of cardinal importance. What it has been possible to achieve with small means, and against tremendous odds, is proof enough that the Jews could do even better if given a proper chance. By expanding Palestine's industries, and intensifying her agriculture, through the irrigation of waste lands and the creation of hydro-electric power, the Jews are opening up a hitherto undeveloped region to civilisation. Of necessity, this must stimulate development in the less advanced regions of the Middle East, strengthen the economic bonds between Palestine and the neighbouring countries, and perhaps in time banish the suspicion and animosity which now divide the various peoples. Such a prospect may seem remote at present; yet time may show that patient constructive effort, and service rendered, are stronger than political passions.



Air view: Palestine Electric Corporation

## Palestine: A Promise for the Middle East

It was during a study of land use in the Old World in 1938 and 1939 to learn how the farmers and stockmen of America may profit by the experience of the Old World, that I became especially interested in Palestine. For it was here in the midst of the run-down, misused, and underused lands of the Near or Middle East that the splendid reclamation work of Jewish agricultural settlements give promise of a new day in these old lands. Egypt is an exception to the general state of deterioration of its lands, because of the extraordinary features of the Nile Valley that have safeguarded this wonderfully productive area from wastage of erosion or salinization of land under ancient methods of irrigation. But in Palestine there is hope for a new day for the entire Middle East, if the heroic work and devotion of Jewish settlers to the reclamation of the "promised land" is permitted to come to fruition.

My approach to the problems of the Middle East is not through its politics, but through its lands. I have sought to read the record as it is written deeply in the land for all to see who have eyes to see. I follow the lead of the great British engineer, Sir William Willcocks, who, in speaking of Mesopotamia said "I have no interest in the politics but in making ten blades of grass grow where one grew before." Political issues, like the weather, are changeable, but the landscape, with its great potentialities, if intelligently made use of, abides through all vicissitudes of weather. No policy can long endure that does not provide food enough for all the people. A sound and enduring social structure can only be built on the conservation and improved production of useful things from the land. For land is the silent partner in the rise and fall of civilizations. We may well begin this discussion of Palestine with a consideration of the land base of the Middle East, whose fate Palestine has shared in the past, and for which Palestine may show a way out to a new and better day.

Palestine is a very small part of the Middle East which is comprised of Turkey, Iraq, Syria, Lebanon, Arabia, Palestine and Egypt. The

Middle East is a vast area of land of many sorts, lying in a semi-humid to desert climate. In it a few mountain ranges rise high enough to condense waters out of moisture-laden winds to water forests and fields and to nourish rivers for irrigating great low-lying alluvial plains of great fertility but scant rainfall. The full advantage of soils of arid climate full of mineral plant foods may thus be utilized in the zones of grasslands and deserts. These features and conditions prepared the Middle East for the cradle of Western civilization. For food in abundance could be grown in comparatively small areas with relatively high efficiency of farmer manpower. Vast grasslands fed flocks part of the year and forests of the upstanding mountains supplied needed building materials, according to deciphered records of the ancients of these lands.

The genius of native peoples early made use of these peculiar features of this historic region. Out of their genius has come down to us many of the commonplaces in our life to-day and more particularly in our philosophy, science and religion. It was a case of a people working in a favourable land that brought on the division of labour and organization of society, and spiritual insight that gave to the world the beginnings and hopes of common men of western civilization. These are the Holy Lands, in which peoples of the western world are blessed and are profoundly interested.

At the same time, this highly favoured region was visited by a curse, of which recognition was early shown in the Bible story of Cain and Abel. This curse rose out of antagonisms and conflicts between the tent dweller and the house dweller—the shepherd and the farmer—the Bedouin and the Fellah. Alternations of seasons of winter wet and summer dry imposed nomadism on shepherds. They ran their herds on the grasslands and desert borders during winter rainy seasons, but were under the necessity in the long, hot, dry summers, to seek out feeding grounds in river valleys where sub-irrigated alluvial plains grew green pasturage. Such was an ideal set-up for a migratory grazing economy

of nomadism. Variability of seasonal rainfall also induced the mobility of nomadism to wander to those areas where rains had been heaviest and grasses were the most luxuriant in winter and spring. But when peoples of the valleys, as well as settled nomads, learned irrigation farming, they gradually occupied alluvial plains and became house dwelling farmers with fixed abode, with little or no relation to the economy of migratory grazing. They did not grow hay to feed the herds of the nomads during the summer. Nomads were gradually pushed out, or were kept out of their erstwhile summer feeding grounds. They fought back. For the desert seemed to produce more people than could be fed with these diminishing summer grazing grounds, and from time to time denizens of the desert under bold leadership swept down into valley plains and sacked and destroyed and passed on, or at times they replaced the farmers, and themselves became farmers, only later to be attacked or swept out by another wave of hardy and fierce nomads out of the desert. Time after time, these waves of destruction blighted the Holy Lands of Western Civilization. In Mesopotamia, eleven civilizations have risen and fallen during the past seven thousand years. Iraq is the twelfth. These destructive waves have time and again laid Palestine waste as well as adjoining lands.

The decline of Palestine began with the Arab nomad invasion in the seventh century of the Christian Era and was made worse after the second invasion in the eleventh century. The decline of Palestine reached its darkest stage in the four hundred years of Turkish rule from 1517 to 1918. The old Turkish regime was quite different from the rejuvenated and progressive country of to-day. Oppressive taxes drove farmers or fellaheen into the hills and into semi-nomadism. A tax was laid upon every standing tree, and rather than pay the tax farmers cut the trees until the country became practically treeless. Also, farmers were the natural prey of wandering nomadic tribes. By the middle of the nineteenth century, conditions of population and land were at their lowest ebb. Insecurity prevailed throughout the country as bedouins plundered farms and robbed travellers and caravans on the roads. Thus, gradually, the ancient agriculture of refined measures of

husbandry and conservation was supplanted by a goat culture of roving Arab nomads, who cared nothing about a permanent abode, but cut down trees for fuel and moved on in search of pasture. Their herds of goats over-ran the country, eating everything into the ground. At the end of the long dry season, soil was bare and defenceless before heavy fall rains and soil erosion took its toll with every heavy shower. Productive soils were eroded off the slopes and washed down into the valleys, there deposited to form marsh lands or were carried out to sea to muddy the Mediterranean as far as the horizon. In February 1939 I was out in just such a heavy storm and saw a demonstration of the vast wastage of soil which had been going on for centuries.

During these years of low ebb of the Middle East, Palestine was depopulated until by 1850 the total inhabitants numbered less than 200,000 souls, living amid malarial swamps, eroded hill sides and broken down terraces. Instead of the three million prosperous inhabitants of Roman times, Palestine was an empty country and its lands underused and abused. This was the picture when the first Jewish settlers entered Palestine in 1882 and began their reclamation of malarial swamps and long neglected lands.

Since that time, a great change has come over the land; the people have seen a great light. We noted a sharp contrast between the old and new condition as we travelled along the highway outside Hadera, one of the earliest Jewish settlements. On one side of the road was a group of black and brown "hair houses" or goat hair tents of semi-nomads near a field of "patch cultivation" where the yield of grain was no more than five bushels per acre. On the other side of the road was a modern Jewish well-tilled irrigated orange orchard, with its waxy deep-green leaves dotted with white fragrant blossoms and illuminated with ripening fruit. The farmer was cultivating between the trees with a tractor, drawing a many-shovelled cultivator. In the distance through the trees, was a neatly painted modern home.

Here was the difference in types of agriculture and modes of living that show forth the dynamic changes in progress in this Holy Land of the Western World. Here, instead of subsistence farming of low efficiency, was a modern scientific farming of high efficiency. With this, the

farmer's purchasing power is increased. He is able to support an industrialized super-structure that provides good and useful things which the farmer may buy and enjoy a higher standard of living. This is the direction in which the world of to-day is going. This is the direction of progress which cannot be stayed. Modern efficiency, and a chance for the common man, for the farmer and worker to earn some of the good things of life, have entered the Middle East at last. This trend may be delayed, but it also cannot be stayed. It will be opposed by the exploiters of the fellahen, for it endangers their racket. The magnificent reclamation of old misused and under-used lands in Palestine calls the attention of the world to the Middle East as showing a demonstration and a promise for a great future as well as a lesson to the rest of the world, to care for and to conserve its lands.

All the more has this area become the object of international interest by reason of great reservoirs of petroleum which are found to underlie these Holy Lands. America, as well as other great Powers, will become more and more interested in the Middle East for this reason.

In my study of land use in North Africa and the Middle East, involving 18,000 miles of travel through North Africa, Palestine, Lebanon, Syria and Iraq, I found, with the exception of the oasis of Damascus and Egypt, this vast region in a state of decline, under-used, misused and under-populated. Nowadays, wretched villages of a few hundred people stand in the place of great and prosperous cities of ancient times. Ruins of magnificent public buildings beautifully designed and decorated as those at Palmyra, Bare, Balbeck, Jerash, Amman, Petra, Cæsarea and Samaria, with their homes of refinement, culture and prosperity, have lately been excavated from out the accumulations of erosion by wind and water. These great centres are forsaken and in their places are villages with their people in houses and hovels no match for those of cities in ruins. Great works of dams for reservoirs and aqueducts are broken down. The people of to-day show neither the genius nor the culture that gave rise to the state of ancient civilization of this historic region.

Farm terraces that once covered vast areas of hill lands and reached high stages of refinement

in conservation of soils and waters have generally been abandoned and overrun by goat herds of nomads and semi-nomads. Lack of maintenance of these remarkable works of conservation has let soil erosion do its work for a thousand years and more to this region that once was the centre of power and culture of the ancient world. Conditions studied in Iraq, Syria, Lebanon, Trans-Jordan and Palestine give rise to this conclusion. But only Iraq, Lebanon and Palestine will be discussed in this chapter.

Modern Iraq includes Mesopotamia, lying between the twin rivers of Euphrates and Tigris. As I stood on the ruins of Babylon (April 1939) in the midst of salty desolation, the only living thing I saw was a wolf, shaking his head as if he might have a tick in his ear, as he loped along to his lair in ruins of one of the seven wonders of the ancient world, the Hanging Gardens of Babylon, where air conditioning was in use 2,600 years ago. Baghdad of to-day is the descendent of the Queen city of Babylon, but in no way is its equal in power, population, or status in civilization.

Archaeologists estimate from ruins of villages and cities and from ancient records that the population of ancient Babylonia may have been as much as 30 millions, whereas to-day the population of Iraq, including nomads of extensive bordering grasslands, is less than four millions (1939). The population has declined not only in state of culture but in numbers as well. Status of land was my special interest. Hundreds of abandoned canals lie across dry plains. Little mountain ranges of silt, or "spoil banks," are piled high on each side of abandoned canals, one beside another, showing that as cleaning a canal of silt became more work than digging a new canal, old canals were abandoned and new ones were dug. According to the log of our car, we crossed 98 such abandoned canals on the road from Baghdad to Mosul. At one point, I found eleven abandoned canals beside a partially choked canal now in use. In my flight over Mesopotamia in 1942, I had a good aerial view of great areas of abandoned land marked with silted up canals and drifting soil dunes. Irrigated lands of to-day are only a small part of those once irrigated.

The decline of population, mode of life and prosperity of this "Garden of Eden" land



cannot be ascribed to adverse change in climate. For Mesopotamia has always required irrigation water for growing crops, as it does to-day, because of low rainfall, averaging less than 10 inches per annum. Some years it falls below 5 inches. The physiography is that of an arid land for a long time geologically speaking. Soils of ancient times are fertile calcareous loams and are still in place. The great Tigris and Euphrates rivers run full of life-giving waters, ready to be diverted and spread upon this vast area of fertile alluvial lands. The land is ready for a series of great irrigation projects to make it fruitful again.

Failure of canals to deliver irrigation waters would be sufficient reason for depopulation and decline of this arid and historic region. Choking of canals with silt from lack of manpower enough to clean them would, by cutting off the waters from villages and lands, more effectively depopulate the country than would an invading army. Shifting of river courses would also leave cities high and dry. Or cutting of diversion dams by a hostile army as that of Hulagu Khan (1298) would put the population to flight and undermine the prosperity of the region. Just these events happened, leaving the land desolate with only remnants of the former population remaining. Their weakness made them a greater prey for the surrounding nomad tribes, plundering from out the desert.

It appears then that not adverse climatic change has wrought this devastation in Iraq, but that it is solely the handiwork of man. If this be true, it follows that the land can be restored to its former state of production and greater if modern methods are used. This has been proved by experiments out of Baghdad, which I examined in 1939 and by the construction of modern diversion dams such as the Kut Barrage in April 1939 where I was a guest of the Government of Iraq at the official opening of this structure for diverting waters of the Tigris River to some 500,000 acres of land.

On the basis of the present density of population in the Shatt-Al-Arab and the land that was under irrigation in times past, it would be possible to support some 25 millions of people. Yet with modern engineering structures, with up-to-date powered construction machines and with reinforced concrete, it will be possible to

put in permanent diversion dams higher up river to give higher heads, and with power-driven excavation machines for digging canals to deliver waters to a greater area of land than was under cultivation in ancient times. Likewise, with power machines, canals may be kept clean of silt with safety. According to these estimates and according to the great British engineer, Sir William Willcocks, it appears that this vast land of fertile alluvium, the Mesopotamia of old, may be made to support at least tenfold the present population of four million people.

Iraq presents one of the great reclamation projects of modern times, where two score millions of people may be supported and great supplies of goods grown to exchange for useful goods from other countries and to support local industries. The chief shortcoming in Iraq is lack of vision of officials in recognizing possibilities of the country and the need of farmers to cultivate reclaimed land. At the opening of the Kut Barrage, referred to above, I commented to the Minister of Agriculture, that I presumed other projects would soon be started. He replied: "No, for we do not have enough farmers to make use of water that can be had from this one diversion dam." Development of Iraq towards its great possibilities of the future is held up for lack of farmers. A large increase in population in Iraq is needed to improve the land and prosperity of the people. Immigration is not encouraged. A very high Iraqi official recently told me: "We do not want immigration, even of outside Arabs—we want to 'born' our own population." This attitude greatly handicaps the development of a land of four or five million people which has the ultimate capacity of providing a higher standard of living for 30 to 40 million population.

Another area of the Middle East showing in its land a long decline from its former state of intensive agriculture and prosperity, is the Christian Lebanese Republic, a separate French Mandate from that of Syria.\* Lebanon is a mountainous land whose highest ridges reach about 10,000 feet altitude. The flanks of its picturesque slopes are strewn with ruins of thousands upon thousands of rock-walled terraces that once held soils in place for intensive

\* Both recently granted independence.



cultivation. I credit the ancient Phœnicians, a Semitic people, for having first encountered the problem of soil erosion on these slopes under rain farming and also for having worked out an effective solution for conserving water and soil by level bench terracing. At Beit-Eddine I found terraces still in good repair that may well have been farmed for three to four thousand years.

Forests of cedar were the object of a special study in mountainous Lebanon. The destruction of these ancient forests and the denuded, erosion-ruined slopes once covered with mighty cedars are a tragic example of how mankind has exploited the region.

According to the record (Bible, I Kings v. 6-18) Hiram, King of Tyre, agreed with Solomon to furnish him with cypress and cedars out of the forests of Lebanon for construction of the temple at Jerusalem. According to the record, 60,000 wood cutters or lumberjacks were put to work in the woods and 80,000 men as bearers of burdens to skid the timbers to the sea and to load them on ships to be unloaded at Joppa for Jerusalem. This famous ancient forest of about 1,000 square miles is now gone and only four small remnant groves are left. The Tripoli grove of 400 trees in a 20 acre enclosure, standing at 6,000 feet altitude, is the most important. Up to 300 years ago, the ancient cedar forest had been reduced to scattered veterans of which 44 "wolf trees" remain. Then a church was built that made the grove sacred, and a stone wall built to keep out the goats. Protection from the ubiquitous goats let seedlings from seed spread from the gnarled old trees, grow up close together to form dense stands of young cedars, growing tall and straight. This young stand is judged to be about 250 to 300 years old from stump count of 272 annual rings that I made on a stump of a windfall of one of the second generation of trees.

Here again, this grove of trees, that spread when given protection against goats, is evidence that the ancient forest was not necessarily destroyed by reason of a change in climate. It has been demonstrated that if given a fair chance, the forest of cedars would grow again in its old site. Here is evidence of a hope of reforesting slopes unsuited to farming or grazing, where sufficient soils remain in place.

Palestine is the third area full of instruction, and with a promise to be the heaven or concrete example to show how modern and scientific principles can be put to work to rejuvenate the entire Middle East and provide a better way of life and higher standards of living for the long exploited and down-trodden peasant. Because of the splendid work of the Jewish agricultural colonies, it shows by contrast the decline that has afflicted the Middle East and the promise of a brighter future for this important region. My studies of the Palestine area were facilitated by the British Mandate Government. Armoured cars were made available so that I could get about over the country in spite of terrorists who were dangerously active in 1939. Also an airplane was supplied with special permission to take pictures from the air. In this way I was able to examine the land in its state of decline and deterioration and, by contrast, to study many Jewish agricultural settlements with their examples of reclamation of the malarial swamps, restoration of terraces, and tree crops, and the replanting of forests on forbidding rocky slopes. I found the land of Palestine, except the areas reclaimed in recent times, to be generally in a state of decline as is Trans-Jordan, in population and in production of the land, as compared to its condition as it must have been at first when described in the Biblical record when Moses stood on Mt. Nebo some 3,000 years ago. For Palestine—the promised land, according to the record was "a good land, a land of fountains and depths that spring out of valleys, a land of wheat and barley, of vines, fig trees and pomegranates, a land of olive oil and honey, a land wherein thou shalt eat bread without scarceness. Thou shalt not lack anything in it."

This description of Palestine in the time of Moses would be fanciful except for two facts. First, the similarity of Southern California and Palestine is so close in climate, topography, soils and vegetation that the present condition of similarly placed areas in California is a reliable index of the early condition of the land of Palestine. Vegetation varied from desert scrub on lower slopes of the Jordan Valley and Dead Sea, to luxuriant forests of Cedars of Lebanon on the flanks of Mount Hermon, similar to the desert vegetation from Coachella Valley below sea level in Southern California to pine and fir

forests on lower slopes of Mt. Baldy (10,000 feet) in the San Gabriel Range. Rainfall favours Palestine, for Tel Aviv gets more rain (21.5 inches) per annum than Los Angeles (15.2 inches), and the Mt. Hermon mountain land mass gets up to 70 inches of rain while Mt. Baldy only 50 inches. Other comparisons are striking.

The second fact is that the restoration and reclamation work of the Jewish settlements shows forth in samples throughout the mandated area what the whole land must have looked like in its pristine condition. The same crops grow to-day, where there is soil enough, as grew in ancient times. The climate has not changed as to temperature as shown by the growth of the date-palm, a plant very sensitive to temperature ranges, throughout the period.

Whether rainfall has decreased in historic times has been much discussed. The evidence is that rainfall has definitely decreased since Palæolithic times back in the Ice Age. Also in historic times variability of rainfall has prevailed. But in my experimental studies of rainfall, erosion and run-off in the past 20 years, I have measured run-off from a bared soil as much as 50 per cent. of the rain that fell in a heavy storm. Our nation-wide studies of the Soil Conservation Service show that conditions at the ground surface may vary the effectiveness of rain far more than would be critical changes in climate. During a heavy rainstorm, on February 22, 1939, I saw along the way from Jerusalem to Haifa, roaring "gully-washers" charging down drainages, red brown with soil eroded from fields and side walls of gullies, to turn the blue of the Mediterranean to a dirty brown as far as the horizon. The condition of gullied slopes and rock strewn stream washes is evidence enough to a physiographer that such storm floods have been taking place for a long time.

These observations raise doubts as to any important change in average amount of annual rainfall. Apparent differences in effectiveness of rain that falls can be ascribed to conditions of soil surface as it affects the intake and storage of rain in the soil and underground. Such differences in intake might well be equivalent to adverse change in climate, and produce the same effects. It is not surprising that before quantitative studies had been made of the

effects of soil surface conditions on storm run-off, that deterioration of the land was ascribed to adverse changes in climate. But conservation of rainfall has produced remarkable results in Palestine as it does in America. Accelerated erosion is a symptom of increased and flashy run-off of rain with its consequent reduction in effectiveness. This is true in many lands round the world.

Variability of rainfall, moreover, can be expected in a semi-arid climatic zone with steep range of rainfall, from Mount Hermon with 70 inches of annual rain to southern Negev of 5 inches (Figure). Zones between humid areas and deserts in the western plains of America and in Africa are marked by similar variations in annual rainfall. Famines due to such variations occurred in Palestine in ancient times until measures for conserving soil and rain had developed to high degrees of refinement, as was the case in Palestine when Jerusalem was at its height. This condition of the land continued through Roman and Byzantine times until the Arab and successive nomadic invasions. Such variability does not necessarily mean change of climate but is normal and is to be expected in regions so placed. Agriculture to sustain a people must be designed to meet such variations in weather.

C. E. P. Brooks, in reviewing the evidence on climatic change in historic times says, "The material is certainly insufficient to establish the existence of systematic world-wide rhythms or pulsations of climate." He also reports that rainfall observations in the Mishna for Palestine show the amount for a good crop at the beginning of the Christian Era corresponds closely to that deduced from modern observations in Jerusalem.

The most telling evidence that present climatic conditions in Palestine permit of restoration of the land to a far greater state of production and prosperity is found in the 290-odd agricultural settlements. These settlements are something new under the sun. They may serve as a series of demonstration projects covering about 6½ per cent. of the total area of Palestine and 14 per cent. of cultivated area, ranging from coastal plain malarial marshes to rocky highland slopes of upper Galilee, and down to salty soils of the lower Jordan Valley. These agricultural

colonies have demonstrated and are demonstrating in the most realistic way a number of facts of highest importance as to the future of this magnificent venture in conservation, not only in Palestine, but in the Middle East as well. Here we find the deeper meaning and possibilities of conservation with highest use of the earth's land and water resources for the welfare of peoples. This has meaning for other countries of the world as well.

Unused and under-used lands of local Arabs have been bought at prices five to tenfold what we would pay for similar lands in California. Most generally these lands had been made unsuited to cultivation by erosion, through choking streams in valleys to form marshy land in which malaria became deadly, or again by erosion through washing soil off slopes to bed-rock. Fortunately for Palestine, country rock is limestone and is run through by solution fissures and pockets holding remnants of the fertile red earths that once covered the hill lands. Such hill lands will support tree crops of browse or orchard, or forest. All such lands require a great amount of work in reclamation for growing crops best suited to the site. Not only were prices high but much preparatory work at an additional cost had to be done. But these were costs of devotion to the redemption of the "promised land."

It is clear that resettlement of this land is not a commercial venture from which 10 per cent. profit is expected. This is not a commercial business enterprise at all. It is rather an economy of survival, and must be put into the same economic category as war. The cost of World War II to the people of the United States is already nearly 10 times the value of the farm land of the nation. Commercially we could not afford to spend so much for this war, but for our way of life, a thousand times, yes.

Special genius of a people to resettle and restore such a land as was Palestine at the depths of its decline in the 1880's is another important fact demonstrated by these colonies. Not only in agricultural reclamation, in reforestation, and in live stock improvement, but in fitting and building industries to make the most of resources and manpower, is this genius shown.

This genius is in marked contrast to the backward peasant Arab people suppressed and

exploited under a semi-feudalism. Resistance by vested interests that exploit the fellahen to changes that would liberate and give the fellah a fair chance at better things can be expected. From my field notes, reference is made at many stops in the course of surveys throughout Palestine to the destructiveness of goats of semi-nomads. Gardens are possible only when walled against this ubiquitous animal. Goats are indeed cloven-hoofed locusts. Goat herds break down terrace walls exposing terraced soils to erosion that becomes more destructive than on untiered slopes. Goat population averages about one to ten acres of hill land. They are called the poor man's cow, but they impoverish the land. Keeping the goats and bees is not compatible, for goats eat up the flowering plants. The unrestricted running of goats over the landscape of Palestine and other areas of the Middle East has been one of the chief causes for the acceleration of erosion and the damage to and destruction of land.

Against such scenes of land wastage and deterioration a visit to the farm of Mikveh Israel is a revelation and a promise. The land of this farm was fully clothed with vegetation of different crops in rotation. Slopes are brought into production to support orchards, vineyards, and grazing and browse pasture. The whole face of the landscape is changed from a state of deterioration, wastage and decline to one of production, conservation of the soil, and of the rain that falls on it and for the production of more and more abundant crops as the fertility of the land is gradually improved.

Agricultural settlements making use of up-to-date science supplemented by industries of Jewish settlers have become successful demonstrations of how this ancient Holy Land may be restored to a much greater state of population and of prosperity than it was and now is. Incidentally these several developments were of high service to the Allies during the war, especially in the dark days when it seemed that Rommel could not be stopped and was at the gate of Alexandria.

Still another fact of highest significance in providing places for refugees, is the elastic organization of the co-operative settlements. It is possible to absorb promptly great numbers of refugees for aid and training to establish other

colonies or to undertake industries and great reclamation works as proposed in the Jordan Valley Authority. This feature of the agricultural settlements offers a way of handling the refugee problem of Europe rescued from Hitlerism, that is now of highest urgency. This example of the agricultural settlements in Palestine must interest all students of the problem of Jewish refugees in Europe who are trying or hope to flee scenes of their most inhuman and barbarous persecution in Hitlerized Europe and look to the United Nations for a solution.

In view of this critical situation affecting nearly two millions of human beings of Europe, who at this time of writing still languish in their hateful displacement camps, the question of the economic absorptive capacity of Palestine arises. For the term economic absorption was used to set an upper limit of immigration into Palestine in the White Paper of 1939. Can Palestine be made to support a larger population?

What is economic absorption? The answer to this question takes us back to the basic structure of a civilized society. The carrying capacity of the earth for a human population is, in the final reckoning, as simple as the carrying capacity of the range for cattle; it is measured by the production of food. But in the case of human populations, transportation and commerce in food make it possible to concentrate people in cities beyond the food production of local areas; likewise, people may be concentrated within a country beyond its food production capacity if that country has goods and services which other countries are willing to accept for their food exports.

The so-called "economic absorptive capacity" for a given land area will then be the sum of the people who can be fed with products grown within that area, and the food which can be regularly purchased with exports. This number is not a fixed quantity, for absorptive capacity is a dynamic geographical relation; it depends on the genius of a people for agriculture, for measures of conservation, and for industries, and on their efficiency in these divisions of labour; as well as on possibilities of exchange of manufactured goods for food.

Great Britain is a good example to make this matter clear. "Absorptive capacity" of Great Britain before the Industrial Revolution was equal to the food that was grown within the borders of the country. The population in 1801 was slightly in excess of nine million. But Great Britain, because of the genius of her people, was the first country to develop industry to build up exchanges for importing food. With this development, population has increased to about 46 million, until before the war the country produced a third of the food that the population required. The genius of the British people favoured with suitable raw materials thus increased the economic absorption of their country to three times the production of food within the country. But during the war agricultural production was stepped up to supply, on war rations, two-thirds of the food supply. In conditions after the war some agricultural authorities say Great Britain will grow about one-half its food supply. The other half, of course, must be imported in exchange for exports of its industries. There is no real reason to limit the absorptive capacity of Greater Palestine to any less than twice its capacity to grow food.

Yet the upper limit of economic absorption capacity of a geographical area for a human population is difficult to set; for it depends on several factors. Among these are: (1) inherent fertility of the land base, (2) easy access to ample raw materials in quantity and varieties, (3) suitable means of developing power, (4) access to food supplies for import, (5) genius and skills of a people to make the most of natural features and resources of the land and its waters and of modern technologies.

A review of nations of the world shows a wide capacity in the peoples to make the most of what they have in natural resources and in opportunities to better their condition. Sicily with an area of 9,860 square miles, less than that of mandated Palestine of 10,425 square miles, had a population in 1940 of 3,996,866, who derived their support entirely from agricultural pursuits. Holland, with an area of 12,704 square miles, had in 1939 a population of 8,728,569. By means of remarkable reclamation works more difficult than those of the proposed Jordan Valley Authority, and with industries,

the genius of the people of Holland supports a population at the rate of 7,273,000 on an area equal to mandated Palestine. Belgium, with an area of 11,775 square miles, supports with its industry a population of 8,386,000, or at the rate of 7,421,610 on an area equal to that of mandated Palestine. In the proposed Jordan Valley Authority, including Palestine of 10,425 and Trans-Jordan of 34,740 square miles, making a total area of 45,165 square miles, it is estimated that with reclamation and power development and use of land and waters to a degree no greater than in California, this land of unique features and resources may be made to support a population of about six million.

While comparisons are suggestive of practical possibilities, reliable estimates call for an analysis of land and water resources. The "economic absorption" of Palestine can only be set after the five questions listed have been fully answered. At present only tentative figures can possibly be given, for some data are lacking.

First, as to inherent fertility of the land base. The geologic structure, geographic setting and prevailing climate of this small corner of the Middle East have combined in a way to make this area unusually productive, as well as strategic. Limestone is the country rock, that under semi-tropical climate yielded a deep red soil of unusual fertility. Moreover, this limestone is shot through with solution crevices and pockets that are filled with this good soil near the surface and at greater depths by channels of underground drainage common to limestone regions. A part of seasonal rain waters disappear underground to come forth at some later time in great limestone springs that flow more or less throughout the year. It was these springs that favoured year-long settlement in ancient times.

The region of the Jordan River, including Palestine and Trans-Jordan and the maritime slopes, is quite similar to California, but has an added advantage of its limestone country rock. The climates are alike, the natural vegetation, the physiographic features, except for the great limestone springs in Palestine. Similar crops may be grown. Differences are that soils of Palestine were uniformly better, that uplands have been badly eroded from misuse, and that

slopes of Palestine favoured tree crops and were terraced where surface rock was ready at hand. The Holy Land was occupied, beautifully farmed and conserved for more than a thousand years by the Jewish people, and again it was let fall into run and misuse and waste for more than another thousand years, after dispersion of the Jews and invasions of nomadic Arabs.

During the long period of the decline of Palestine, soils were washed from eroding slopes and choked stream channels across the coastal plain, causing marshes to form that became infested with deadly malaria. Grazing of sandy land into the ground along the coast released sand dunes that were moved inland by prevailing winds, that also backed up streams into deadly marshes. Terraces were over-run and allowed to fall into ruin and became the prey of erosion for many centuries. But when intelligent measures of conservation, of sand dune fixation, drainage of swamps, restoration of terraces and replanting of rocky hills are carried out, surprising and gratifying results take place. Just such evidences are found in the Jewish agricultural settlements of Palestine. A true conception of what has been done can only be had by a personal inspection of these Jewish agricultural settlements.

The land base of mandated Palestine comprises an area of about 10,400 square miles, or 6,650,000 acres, about the size of the State of Vermont, or of Wales, including, according to Strahorn's soil survey, 5.5 million acres of hilly land and 1.15 million acres of land suited to farm crops, of which 750,000 acres are irrigable. Strahorn's soil survey does not take into account hill lands that may be devoted to intensive use for grazing and browse, or hill lands where tree crops may be grown to yield food and forage crops and forests may be planted to increase the intake of ram into the soil and to grow badly needed fuel and timber products. Likewise, salty soils in the Jordan Valley, that have been leached and farmed in a successful experiment, were left out of the estimate of possible farm lands. The total area of the Palestine Mandate is about 6,650,000 acres, of which approximately one-half, 3,000,000 acres, it is estimated, may be farmed, of which about 1,000,000 acres can in time be irrigated by sprinkling, a new method growing in favour;

one-third, 2,000,000 acres, may be devoted to tree crops, pasture and browse; and 1,650,000 acres, to forest plantations. For more exact figures, a full-scale survey of land-use capabilities is needed similar to such surveys as are carried on by the Soil Conservation Service of the United States

Because of long dry summer seasons and variability of rainfall most dependable intensive farming requires irrigation. But, as in California, areas that can be irrigated are limited by available water rather than by suitable land. In other words, there is more land than water. The total area possible of irrigation is determined by taking an inventory of irrigation water that may be developed by conservation, storage, and diversion. An engineering study has been made on the basis of data now available.

Duty of water varies from 0.60 metre depth to 1.25, with an average of 1.0 metre depth per year in addition to overhead rain. Water required to irrigate one acre is placed at 4,000 cubic metres, or 3.25 acre feet. On this basis the area of land that can be irrigated is found by dividing the total of storage and diverted water in cubic metres and that available from springs and wells by 4,000 to give the number of acres of land that can be irrigated. For water, rather than land, is the limiting factor in irrigation both in Palestine and in Trans-Jordan, as it is in California.

Duty of water at 3.25 acre feet per annum is conservatively high as an average. In Southern California duty of water is 1.7 and 2.0 feet in addition to overhead rain. But the duty of water in the Imperial Valley, similar to the Jordan Valley, is 5.0 acre feet. Moreover, it is reported from the Rehovoth agricultural experiment station that overhead sprinkling systems of irrigation increase the water efficiency by 30 per cent. This method is growing in popularity in California as well. In other words, it takes about two-thirds of water to irrigate with sprinkling systems as it does by canal and furrow irrigation. Employment of this method would increase the area possible of irrigation.

Irrigation by overhead sprinkling techniques does not require costly levelling of land. Irregular land and slopes may be irrigated as well as level land, as is done for southern

California. This advantage favours the growing of tree crops on slopes that would not otherwise be possible. This more efficient use of water only extends the limits of irrigation farming and emphasizes the fact that available water rather than land limits the irrigable area of Palestine.

At the present time water for irrigation is diverted from springs and is pumped from ground waters in the coastal plain. The total area so irrigated is reported at about 100,000 acres.

Water is reported in cubic metres per year. A dunam, practically one-fourth of an acre, is the unit of land measure, and is practically 1,000 square metres in area. Water one metre deep over a dunam is 1,000 cubic metres and over an acre is approximately 4,000. By dividing the total flow of streams for one year by 4,000 gives the number of acres that may be irrigated when water supplies are fully conserved and applied.

Stream flow records of the Jordan are for the years 1926-38 measured below Tiberias; of the Yarmuk, 1927-38, measured since 1933 on the basis of flow into Yarmuk Reservoir, and of more fragmentary records of other reaches of the Jordan, its tributaries and wadis into the Mediterranean Sea. A longer record is highly desirable. But these figures are quite probably lower than long-period averages. For the annual rainfall record at Jerusalem from 1850-1939 shows the period 1920-39 to be below the average for the 90-year record. In the past winter season 1943-44 rainfall has been exceptionally heavy.

The following records do not cover as long a period as is desirable, yet in the light of what we now know they can be expected as safe estimates with good probabilities of indicating lower than possible results:

	Cubic Metres per Year
Annual stream flow averages:	
Jordan River at outlet of	
Tiberias	528,500,000
Yarmuk River at Reservoir	460,210,000
Littani with two small drainages	600,000,000

Total for Jordan, exclusive of unmeasured flow of many small wadis. This quantity of flow is over and above evaporation losses of the lakes Huleh and Tiberias, estimated at 310,750,000 cubic metres per year <sup>1</sup>	1,588,710,000
Wadis of Coastal Plain	255,000,000
Estimated average annual stream flow	1,843,710,000

This amount of water, when fully developed, as are waters of Southern California, would irrigate over and above land irrigated from springs and wells, by canal system	Acres 460,900
or by sprinkling system	(599,000)
Lands now irrigated	115,000
	(149,500)
Possible increase of area by additional pumping	30,000
By sprinkling systems	(39,000)

Possible total land to be irrigated in Palestine exclusive of Trans-Jordan but including the Jordan Valley 605,900  
or by sprinkling systems (787,670)  
The principal food producing area for Palestine would in time be as follows, including intensive tree crops:

Irrigated land by basin and furrow	Acres 605,900
Irrigated by overhead sprinkling systems	(787,670)
Rain watered crop land	2,394,100
	(2,212,330)
Total farm land	3,000,000

Another 3,650,000 acres will be used for browse and pasture and for forest plantations. This area will supplement the intensive food growing areas and is not credited with the support of any additional people.

<sup>1</sup> The evaporation loss from Lake Tiberias may be saved for irrigation if Mediterranean Sea water is dropped into Lake Tiberias as a part of the power project of the proposed Jordan Valley Authority

This plan is a part of the proposed Jordan Valley Authority, indicated by the logic of geography and full use of land and water resources. The Jordan Valley Authority is proposed to include the entire drainage of the Jordan River and the maritime slope of Palestine, and waters from the Littani River that cannot be diverted for irrigation and would be wasted into the sea.

The land base in Trans-Jordan is three times that of Palestine as now constituted, or 34,740 square miles, about 22 million acres of land, much of which is short grass country and desert, with an annual rainfall below 8 inches. Annual rainfall of 8 inches is the lower limit for safe dry farming based on the experience of the Middle East, although cultivation is pushed to areas of lower rainfall in Trans-Jordan as well as in Western America.

Estimated Stream Flow in Trans-Jordan apart from that of Yarmuk River.

Small streams—cu. metres per year 232,085,000

This amount of water would irrigate in acres of land about	Acres 58,000
or by sprinkling	<sup>2</sup> (75,400)
Rain-watered land with more than 8 inches of rainfall favoured by altitude of 3,000 to 5,000 feet	2,000,000
Nomadic grazing grounds, about	20,000,000

Area that may be irrigated:

Palestine	605,000
	(787,600)
Trans-Jordan	58,000
	(75,400)
Total by basin and furrows	663,000
Total by overhead sprinkling	(863,000)

Dry-land farming area :

Palestine	2,394,000
	(2,212,000)
Trans-Jordan	2,000,000
	(1,983,000)
Total	4,394,000
	(4,185,000)

<sup>2</sup> Figures in parentheses represent areas that would be irrigated with available water by overhead sprinkling.

Tree-crop and browse area:	
Palestine	650,000
Trans-Jordan	1,000,000
	<hr/>
	1,650,000
Forest land:	
Palestine	1,000,000
Trans-Jordan	1,500,000
	<hr/>
	2,500,000
Grass land and desert:	
Palestine	2,000,000
Trans-Jordan	18,000,000
	<hr/>
	20,000,000

The carrying capacity of a human population in a favoured land and climate with intensive agriculture under irrigation, if judged by what is done in China and other old agricultural countries, can reach a high figure. The Chengtu plain in Szechwan supports a population, city and farm, of about 2,000 persons per square mile, which is about one-third acre *per capita*. The ratio for the Valley of the Nile is about the same. But for the estimate of Palestine, one-half acre of irrigated land *per capita* has been used, and two acres of rain watered land of intensive farming. Grazing land that supports live stock population with supplemental food is not credited with the support of any additional people. In the case of the J.V.A. the vast grazing areas when tied into the farming economy will supplement the food supply for the intensively farmed areas. At the same time the grazing people, the erstwhile nomads, will benefit in summer feed for their live stock in the intensively irrigated areas. The harmonizing of the economies of grazing with that of agriculture not only will make for a more complete use of the varied resources of the J.V.A. but may also be made to remove the age-old curse of the Holy Lands, namely, the Cain and Abel struggle between the nomad and the farmer, the tent dweller and the house dweller.

Once food enough is grown for a population, its standard of living depends upon the degree of division of labour and the efficiencies in those

divisions of labour. When farmers produce more food than they need for themselves, they release other members of society for tasks of manufacture, transportation, distribution, and services. Purchasing power then depends on the efficiency within the social structure. This is the basic structure of a society. Free working and exchange may be limited by restrictive forces. But in the case of the Palestine settlements, the main objective seems to be to adjust the people to the land with greatest efficiency. Vested interests fall away before the more inclusive and larger objective. Economics are made to serve this objective, rather than to be served. It is for this reason that the Jewish colonization of Palestine is so full of interest to the rest of the world. For under the trial by fire of persecution and desperation in survival, this people has had to work out the basic relations of a people to the land in which a high standard of living may be achieved in the shortest possible time and at the same time be elastic enough to take in more and more colonists. It is a social phenomenon of the most absorbing interest which displays forces and objectives and controls which are worthy of study by other peoples concerned with the problems of sustained and improved land-use. Elasticity in increase of colonies is a feature especially worthy of notice. If colonists were allotted or homesteaded on tracts of land marked off for separate ownerships, the colonies could not respond so readily to increasing their membership, which the homeless condition of refugees requires. Increased efficiency in farming would neither develop so rapidly nor so generally as is the case in co-operative settlements. By throwing the productive fields into great farms, powered farming with modern efficient implements can be put to use, to increase farmer efficiency. As this efficiency in production per man is increased, other members of the colony are released for other tasks, such as services and manufacturing. Newcomers may be taken into the co-operative as greater efficiency permits of increasing the divisions of labour. Still greater efficiency makes room for more jobs in the co-operative. In this way, the co-operative colonies have demonstrated under the stress of necessity basic principles in industrialization of agrarian economies, and of



raising standards of living within any population.

Yet the Jewish colonization presents a wide range of colonies, from small one or two acre homesteads for growing chickens, to pure collectives. A wide range of examples is available for study. The type of colony that most appealed to me was Nahalal and others like it. Here people live in individual homes where they may pamper their individual tastes, and grow their own vegetables and fruits. But when it comes to growing major crops efficiently, the land is thrown together as a big co-operative farm. This is farmed with up-to-date machinery and findings of agronomy and soil science. Efficient production of crops is had at low costs. In other words fewer members of the colony are needed to grow the food crops and more members are released for local industries and services to raise the standards of living of the entire colony. Individual initiative is fostered, and efficiency of organization is maintained. Membership of the colony may be increased with increased efficiencies throughout without lowering standards of living. These developments in Palestine are instructive.

When the land base of the Jordan Valley Authority as proposed is made use of to a degree equal to the present development of California, it should, on the basis of other intensively cultivated and managed areas, supply food from its irrigated farms, hillside orchards, browse pastures, and its vast range lands for a resident population of 3,680,000. This is conservative when compared with the population of four million supported in Sicily by agriculture alone. The Jordan Valley Authority area is favoured by a strategic location for sea and rail transportation to the marts of three continents. Furthermore, the Jordan Valley Power Project, when fully developed equal to one-fifth of the power produced at Boulder Dam, may increase present industries to gain purchasing power for the import of food to feed additional population above that of the carrying capacity of the land of Greater Palestine. In view of great possibilities for increase of irrigated farming nearby in Iraq, it is safe to estimate that in a short time industries of Palestine would make products above the needs of the local population to buy food enough for another two million people, or

a total of nearly 5 7 million for Greater Palestine. Great Britain is able in this way to import food for as many people as live off the land, which, in the case of the Jordan Valley Authority, would make a total of about 7 3 million people. But the lower figure of 2,000,000 instead of 3,680,000 supported by industries alone is used instead, making a total of 5,681,000 people as a reasonable economic absorptive capacity of Greater Palestine. This figure includes the present population of 1,800,000 in Palestine and Trans-Jordan, and allows for the immigration of all refugees, displaced Jewish people from Hitlerized Europe without displacing the Arab population, but leaving it to benefit by this reconstruction of the countries' resources.

This estimate is based upon carrying out the Jordan Valley Authority as dictated by the logic of geography and the principles of conservation. Such a project is proposed to make full use of the unique land and waters, mineral resources, and topographic features of the Jordan Valley and adjacent maritime slope, as does the Tennessee Valley Authority in the United States. The J.V.A. project calls for full development of sweet waters for irrigation, by diverting much of the Jordan Valley waters to irrigate lands in the Emek and the Negev and on the valley slopes and valley floor of the Jordan depression, so that the flow of the Jordan River into the Dead Sea is reduced to little or none. To replace evaporation from the Dead Sea in its furnace-like valley, it is proposed to bring in sea water from the Mediterranean through a canal and tunnel and drop it through 1,300 feet to the level of the Dead Sea and to convert its released energy into electric power in hydro-electric power plants. This power, plus that which may be developed in other falls of water of the enlarged irrigation plan, will equal about one-fifth of the present power at Boulder Dam, or about 1 billion kilowatt hours per annum.

This power will be enough to serve many kinds of industries, such as extraction of magnesium from the Dead Sea waters to pumping irrigation water from underground sources, and to manufacture of a great variety of products for home use and for export.

The cost of the project has been estimated by competent engineers not to exceed 200 million

dollars to carry out irrigation and power installations. The cost is not in excess of costs of similar works of California. The project has been declared feasible by consulting engineers of international standing and within reasonable cost for a highly developed centre well favoured for intensive agriculture and industry. If carried out in this strategic region the Jordan Valley Authority can be expected to be self-supporting, as well as a refuge for the harassed Jewish refugees of Europe where they might work out their own salvation in dignity and liberty and win their place among the peoples of the earth.

The project may also be financed in whole or in part from restoration of Nazi loot of Jewish property in Germany and Nazi-dominated European countries.

Besides these benefits, the J.V.A. would co-ordinate land-use of grazing lands with farming to harmonize these two economies, whose antagonism and conflict have cursed the Holy Lands for several thousand years. In this and other ways the J.V.A. could be made to demonstrate to the Arab lands how this vast region, now in a state of decline, misuse and under-use, may be restored to its possibilities in population, prosperity and progress. Partition of Palestine would violate this logic of geography and the principle of conservation, and deny full development of the area for human welfare.

In addition to the possibilities of the land base of the Jordan Valley Authority to support an economic absorptive capacity as set forth, other factors may also be satisfied in a post-war world. The second factor of access to ample raw materials is satisfied in the vast amount of minerals in the Dead Sea, and in the strategic location on radiating sea lands and rail lines connecting three continents for import of necessary raw materials. The third factor of cheap power enough to activate industry is supplied in the great power project of the Jordan Valley. Supplementary power from oil and from wind is also possible. The unique features of the North-South mountain range and the daily see-saw of strong winds through mountain gaps offers the development of wind power, which has been claimed could be made to exceed possible water power. The fourth factor of nearness to a potential food-producing

area is well satisfied in Iraq only a few hundred miles away, where lies one of the potential great irrigation projects of the world.

The fifth factor that calls for people with genius and skill to make the most of unique features and resources of the Jordan Valley Authority is abundantly satisfied in the abilities, skill and devotion of Jewish refugees as fully demonstrated in farming and industrial activities of nearly 300 settlements for the redemption of the "Promised Land." With these five factors that measure economic absorption of Greater Palestine satisfied as to physical and technical matters, the project when sponsored by the United Nations may well be put into effect. To carry out a project of such challenge and far-reaching significance, not only to the Jewish people but as a demonstration and hope for the Arab countries of the Middle East, will require manpower in numbers enough and in devotion and zeal. Manpower of the character and in numbers enough could scarcely be found in other groups of people so readily as in Jewish refugees who are fleeing and seeking to flee the scenes of their inhuman persecutions and massacres of their loved ones. The Jordan Valley Authority is feasible and practicable and is the answer to the longings and prayers of a homeless people through the centuries, and can be made a solution to one of the most trying and serious problems of war and post-war refugees with which the Allied Nations must deal. The Jordan Valley Authority puts the principle of conservation in the full and safe use of the earth's resources to work in solving problems of adjusting human populations to the Earth. It becomes a symbol of objective and practice for establishing the basis for an enduring peace among nations. Objections of temporizing political and vested interests fall away as insignificant in comparison with the far-reaching and constructive approach to world problems as set forth in the Jordan Valley Authority for Greater Palestine.\*

\* Since this paper was written the Commission on Palestine Surveys has completed its report on a three year engineering field and office study which discloses that average duty of water will be less than 3.25 feet, or more nearly 2.35 feet. The available water supply will irrigate 706,500 acres instead of 605,900 as estimated by the writer in his preliminary studies.

## Palestine's Economic Possibilities

This article is based on a report prepared for the American Palestine Institute, Inc., and published by the Public Affairs Press under the title of *Palestine, Problem and Promise, An Economic Study*, by Robert R. Nathan, Oscar Gass and Daniel Creamer, Washington, D.C., 1946.

In this age of atomic energy, plastics, jet propulsion, vitamins, increasing mechanization, electronics and accelerating use of synthetics, it is foolhardy to attempt a long-range forecast of the economic development of an entire country. It is not even safe to make such a projection for a selected product or industry. Yet there are situations under which one must hazard the pitfalls of speculation and make an appraisal of the future. Such a situation exists with respect to Palestine. A survey of economic potentialities of that country, as distinguished from a forecast, has been needed for some time. It is possible to project a picture of economic possibilities on a more solid basis than a prediction of what is likely to evolve.

There are those who look upon Palestine as a small territory of some 10,000 square miles, a considerable portion of which can be described as dry desert land and rocky mountains, and conclude that the country is already overpopulated and offers no opportunity for further immigration. These pessimists follow a long line of predecessors who have shared such an outlook at each stage in the development of the country.

There is another school which, out of blind faith or in rationalizing a political attitude, believe that Palestine can absorb practically an unlimited number of Jewish immigrants overnight. These optimists also have had many predecessors but their predictions have never been fully tested, because at times the prospective immigrants have been of limited number and at other times restrictive policies have denied admittance to all who would come. While political decisions respecting immigration and the objectives of Zionism call for the consideration of a wide variety of social, geographic, security, equity and political issues, the economic factors are not without importance in helping to settle the Palestine question. Many

political discussions are unnecessarily confused by recurring references to ill-founded economic conclusions. The economic question appears to have become a convenient peg for justifying procrastination. Also, application of the principle of absorptive capacity as a criterion for determining the level of immigration by the British Government has rendered most important the need for economic evaluations of future prospects. In view of these considerations the American Palestine Institute, Inc., of New York undertook to have an objective, unbiased appraisal made of the economic potentialities of Palestine. The study required two years for completion, including a three-month survey on the site in Palestine.

In determining the nature and scope of the study, it was concluded that a realistic appraisal of economic potentialities of Palestine was not only more necessary but also more feasible than a straight forecast of economic developments of the country. Further, it was regarded as most speculative as well as of dubious value to appraise the prospects beyond a reasonable period of time. The next decade was accepted as the frame of reference for the study.

The absorptive capacity of any country depends upon a wide variety of influences not the least of which are recent trends and current conditions. Naturally, the basic resources of land, materials, and skills are of major significance, but with equal natural resources, the country which has been developing rapidly and which is highly industrialized will be able speedily to absorb more immigrants than the countries which have enjoyed little development in the past. Those factors which have been instrumental in the economic expansion of a country must be carefully appraised to determine their present and prospective force. Out of the present must come a search for new factors on the horizon. Knowledge of the past and

present must also be related to external influences throughout the world.

In evaluating the economic prospects of Palestine, we left few facts and figures uncovered. The availability of land, irrigation possibilities, access to raw materials, skills and managerial ability of prospective immigrants, sources and cost of capital, market prospect at home and abroad, competitive relationship in the Middle East, value of war experience, role of government and other important issues were weighed and woven into a pattern for appraising the over-all economic potentialities of Palestine.

In the past quarter of a century, or the span of one generation, the population of Palestine has nearly trebled. At the same time its standard of living has increased very substantially. There is no specific measure of the total production or consumption of the country over this period of time, but there is ample evidence in various selected data to reveal the amazing progress which has taken place in production and economic well-being. The improvement has occurred in both the Arab and Jewish sectors of the economy.

The stepping up of the average standard of living for the country as a whole is clearly revealed by the fact that the income per capita for the Jewish population is far higher than that of the Arab population and the rapid rise in the proportion which Jews constitute of the total population. The six-fold increase in the production of manufactured goods since World War II; the eighty-fold increase in electricity consumption from 1926 to 1940; the five-fold increase in government receipts in the last 25 years; the many-fold increase in land under irrigation; the phenomenal rise in citrus acreage, and other economic measures clearly reveal the impressive economic gains in that country since the initial implementation of the Balfour Declaration.

Though the earlier settlers made remarkable progress against tremendous odds, much of the economic growth of Palestine was concentrated in the 30's when immigration of Jewish displaced persons reached its peak. These new settlers brought with them highly developed skills, modern machinery and considerable capital. They, along with the pioneers already

in Palestine, possessed a zeal and drive which come with the necessity for facing new circumstances and building anew for the future. These persons were uprooted in Germany and Austria and other middle and Eastern European countries from well established economic and social positions. They arrived in Palestine with the determination to start again and rebuild a better future for themselves and their posterity. It was this combination of tangible and intangible assets which gave the greatest lift to the economic growth of the country and accelerated the progress already in motion.

Prior to the war, manufacturing industries which are the keystone to densely populated prosperous countries, had definitely established a firm foothold. From tiny and isolated manufacturing plants a generation ago, the industrialization of Palestine had become a major factor in the economic life of Palestine. The scale of individual enterprises had increased greatly and the diversity of products was considerable. There was a growth in the production of those goods and services for which the country's economic circumstances were especially suited. The high degree of skill of the immigrants and a growing domestic market as the westernized population expanded led to production of goods which had never before been produced in the Middle East. Home markets were being increasingly supplied by home production. Exports were taking root.

With the coming of war a strong impetus was given to further industrialization. Foreign sources of supply were cut off because of the lack of shipping space. It was now wholly necessary either to manufacture at home a great variety of goods which had previously been brought in from over-seas or else to go without such goods. Other Middle Eastern countries, denied access to various products, turned to Palestine for many of the necessities of life. Above all else, the demands of the British Armies in the Middle East vastly expanded the market for Palestinian products. With the knowledge, capital, equipment, and established enterprises, Palestinians speedily and effectively made the most of their opportunities and developed new industries and rapidly expanded old ones.

It is not often that a country is afforded such favourable conditions for initial industrial development as occurred in Palestine during the war. There was an assured market for most products and prices were adequate to cover not only experimental and development costs, but also to provide handsome profits. Employees were trained, new industrial equipment was produced and mass production techniques were developed. Of course the volume of output was very small as compared with the United States and Great Britain, but relative to pre-war activities the scale of operations was substantially stepped up. There is evidence that considerable inefficiency prevailed and that many new industries will not survive post-war competition while others will do so only as a result of a very great increase in efficiency. Despite the many adverse comparisons of post-war competition with favourable war-time conditions, there is ample evidence that the impetus given to Palestinian industry during the war will not be easily and totally lost in the transition to peace.

Most of the industrial products of the country produced during the war were not especially designed for military purposes and therefore the conversion of Palestinian industry to peace-time products was accomplished without serious delay or major difficulty. On the contrary, the transition was orderly and speedy.

Even though hostilities on a wide scale have ceased throughout the world, many of the economic forces peculiar to war will continue to exist for some time. There are widespread shortages arising out of war which cannot be overcome for many years. Trade relations will not soon be fully restored to normalcy. The cessation of output of munitions is only one feature of conversion from war to peace. Another feature is the re-establishment of reasonable balance between demand and supply and a freer flow of goods through international channels. The latter characteristics are still lacking, and the added support to Palestinian industrial progress which comes from such conditions can be expected to remain in force for a sufficient period of time to give an even firmer foundation to the industrialization of the country.

The war was not as kind to all phases of agriculture as it was to manufacturing industries. Prices and demand for many agricultural products rose sharply and brought prosperity to many areas, but citriculture, which is the most important single source of farm income and the major item in Palestinian exports, suffered severely from restrictions on exports. Citrus groves were allowed to deteriorate and production fell greatly. Some time will be required for full recovery, but prospects are bright for the future of citriculture in Palestine. In the appraisal of the absorptive capacity of Palestine we reviewed in great detail the developments in each field of economic activity up to the present and carefully estimated the forces now at work. In the process of analysis and assembly of the various surveys, it was possible to evaluate independently the prospects in each industry. These independent appraisals were constantly checked and analyzed against a set of overall economic considerations. As a result of this analysis it was concluded that somewhere between 615,000 and 1,125,000 Jewish immigrants could be absorbed into Palestine within the next decade. The lower figure was predicated on reasonably pessimistic economic assumptions whereas the higher figure was based on reasonably optimistic assumptions. Neither estimate represents the outside figure or might be regarded as an extreme estimate. It is possible that a set of economic circumstances could be put in motion which would prohibit the economic absorption of even the 615,000 minimum. On the other hand, were a combination of a number of extremely favourable developments to occur, the larger figure might well be surpassed.

In appraising the economic prospects of the country it was early recognized that the most important single determining factor would be the policy of government. In a modern industrial society it is generally recognized by economists that government must play a positive role in the economic growth of the country. No matter how fully one believes in the principles of *laissez-faire* economics it must be recognized that there are a number of responsible government functions which strongly influence economic activities. For instance, taxation is the necessary role of government.

Different types of taxes have different economic impacts. Whether the government of a country finances its operations by income taxes, payroll taxes, sales taxes, property taxes, import duties or other means, the community will note varied consequences in its economic life. Some taxes are more inflationary than others and some more deflationary. Some taxes restrict consumption and some restrict investment. In addition to taxation there are other fields of governmental responsibility such as currency issue, export-import policies, public works, fiscal policies, education, social security and the like, all of which materially influence the economy.

In Palestine the government clearly has not played a positive and helpful role in economic expansion. In studying one field of policy after another, it is obvious that at best the Palestine government has been neutral with respect to stimulating industrial, agricultural and business progress. A less generous appraisal leads one to conclude that many of the government policies have actually retarded the growth of the economy. Certainly the monetary system, the tax system, tariff policy and the irrigation programmes have all fallen far short of what might be expected under a sympathetic government. Whether or not maximum immigration can be absorbed in the next decade will depend materially upon the policy of the government. Another significant problem with respect to the future of the country is the source of capital. It should be noted here that approximately three-fourths of all capital which came into Palestine in the past quarter of a century was brought in by immigrants themselves. Only about 20 per cent. came through the so-called "national funds," whose source of revenue is in the form of contributions from different countries throughout the world. It is highly improbable that the new immigrants can possibly bring with them the same amount of capital as did the newcomers during the 30's. Most of the Jews in camps in Europe to-day are without resources. Contributions may be stepped up in some countries but the magnitude of capital which will be required for the scale of immigration which we regard as feasible, will certainly not be provided through such contributions.

It is our estimate that between \$1,900,000,000 and \$2,750,000,000 will be needed to finance the immigration of from 615,000 to 1,125,000 Jews in the next ten years. Not only will these funds be required, but it is important that the rate of interest be modest so that not too heavy a burden is imposed upon the country. Some of this capital can come from the accumulation of sterling balances during the war and through additional savings within Palestine in the coming years. Another considerable quantity may come from investments in Palestine by foreign industrial and financial firms. Contributions can make a significant dent in the total needs. In view of the relation between the confiscation and destruction of Jewish property by the Nazis and the transfer to Palestine of those who suffered from these activities, it does not appear unreasonable to expect that some reparations from Germany should be made available for Palestinian development. Finally, direct loans from the World Bank and perhaps from the United States should serve to fill out the financial needs for the contemplated development.

In addition to the matter of government policy and the source of funds, there is the question of skill and working ability of the new immigrants. As a result of the years of suffering and malnutrition of the new immigrants it is unlikely that they will possess the same creative capacities or the same initial physical stamina as did the earlier immigrants. The problem of training and restoring health will call for considerable outlays and will retard progress.

Markets for industrial products will be particularly important in Palestine's growth. As the population increases, the domestic market for industrial products will expand and domestic production can efficiently and economically replace foreign sources. Larger scale of production will strengthen the competitive position of Palestinian industry. Continued world shortages of goods will help the country to establish markets during the early years of readjustment to peacetime conditions. It is assumed that reasonable trade will prevail with Middle Eastern countries.

Within the space of this article no attempt is made to spell the prospects out in great detail industry by industry, nor to expound thor-

oughly each of the factors listed above plus others. Irrigation and power prospects are particularly bright. Citriculture will resume a very important role in the development of the country. Chemicals from the Dead Sea will aid in economic progress. The outlook is good provided the principal factors mentioned above are properly handled.

One particular point needs consideration and that concerns the relation between Jews and Arabs. In recent years there has been only moderate trade between these two groups. The Arabs have without question benefited

from Jewish economic development. However, the standard of living of the Arabs and the economic well-being of the country could be enhanced through greater integration of the two economies. This tendency will depend largely on political and social developments. Both can benefit together and large scale Jewish immigration will raise the standard of living of the Arabs. Even without such integration the economic prospects of the country and its absorptive capacity for considerable immigration are bright.

## Palestine: The Economic Aspect

I do not seek in this essay to survey in terms of statistics the progress made in Palestine since large-scale Jewish colonisation began at the end of the first world war. It is a matter of common agreement, verified anew by every official enquiry, not only that it is, on any showing, a remarkable achievement, but, also, that it has been accompanied by an increase in Arab well-being outstandingly greater than anything accomplished in the surrounding Arab countries. Whatever, this is to say, may be the causes of Arab complaint against Jewish immigration, it cannot be based on economic grounds. On the contrary, the Arab inhabitants have done well out of the Jews. They have sold land at very high prices, and in a quarter of a century no problem of the landless Arab has emerged. They have benefited by the growth of new industries, and by the use of new scientific techniques. A new level of taxable capacity in Palestine, almost wholly the outcome of Jewish effort, has made the quality of social services something the Arab *fella* has never before known. Since, indeed, the British Government has itself emphasised "the undeniable material advantages which Palestine has derived from the efforts of the Zionists"<sup>1</sup> no-one need seriously suppose that the price of Jewish development has been in any way disadvantageous to the Arabs.

No examination of the economic problem in Palestine can begin without making clear certain primary principles. It is important to bear in mind that, from the Diaspora to the Balfour Declaration, Palestine was devoid of any economic significance. Its industries were no more than the most primitive handicrafts; its agriculture, alike in extent and method, had hardly changed since Roman times; a one-time effective system of irrigation had fallen into decay: large areas, like the Negev, were sterile desert; and the overwhelming mass of the inhabitants were poor, depressed and apathetic, victims to be rackrented by the largely absentee *effendi*, on the one hand, or

exploited by their Turkish suzerain on the other. To see the issue in its proper perspective, it is imperative to realise that, before 1917, Palestine, in an economic sense, was a land without hope or prospect. The indigenous Arab *fellaheen* scratched a bare living from the soil. They were largely illiterate; their productive technique was an anachronism; their health was bad and their expectation of life typical of an oriental country which has not been aroused from medieval torpor. No effort had been made to examine the possibilities of improvement. No knowledge existed of modern agricultural science nor of its related sciences. The administration combined corruption with inertia. There is no reason of any kind to suppose that this position would have been altered if the resolution had not been taken to make Palestine the scene of the experiment in rebuilding the Jewish Homeland to which the Balfour Declaration pledged the Government of Great Britain. It was from the fact of that pledge, and the deep loyalty it has evoked from Jews all over the world, that Palestine has entered a second time as a significant factor upon the historic stage.

In the generation which has elapsed since the Jewish Agency began its work, the innovations are beyond measure. There are new industries. There are new towns. The population has an over-all increase, and Palestine enjoys, with the Soviet Union, the distinction of being one of two countries in the inter-war world to show a rise in the birth-rate.<sup>2</sup> There has been large-scale and both assisted and unassisted Jewish emigration to Palestine; but it is important also to note that there has also been large-scale Arab emigration from the surrounding countries. The growth of individualist and private corporate enterprise is, in any showing,<sup>3</sup> remarkable; even Sir John Hope-Simpson, whom no one would accuse of bias in favour of the Jews, has borne testimony to the "immense achievement that effort represents. Yet the achievement of profit-making enterprise

<sup>1</sup> Permanent Mandates Commission (17th session), p. 143.

<sup>2</sup> Permanent Mandates Commission (15th session), p. 189

<sup>3</sup> *Report on Palestine* (Cmd. 3686, 1930), pp. 78-9



is neither economically nor socially so significant as what has been done in the communal collectives; there is a real sense in which these latter may be regarded as among the outstanding experiments in the post-war world."<sup>1</sup> Since the return of the Jews to Palestine, all the resources of modern science have been made available in the Hebrew University at Jerusalem for its development; that in itself is an innovation of high importance. Sir John Hope-Simpson agreed that, even among the Arabs, whose position as cultivators "has always been one of extreme poverty"<sup>2</sup> there has been real improvement. "There is good ground for believing," he has written, "that the poverty-stricken are becoming fewer, and the comparatively prosperous more numerous than they were. There is no doubt that the area of cultivation in the country as a whole has been extended, and many new houses are being built in the villages in every part of the country."<sup>3</sup> To this must be added that industries like textiles, light-metals, and building are all of them well-established; that there is little difference in wage-rates paid to Jews or Arabs, whether skilled or unskilled, and that the constant tendency of real wages has been to an increase with a consequent higher standard of living. If it is true that the Arab transport industry has suffered, this is quite obviously the outcome of the fact that the donkey and the camel do not successfully compete with the motor-car and the railway. Nor is it surprising that there has been some displacement of Arab labour in quarrying, and among stone-masons and stone-dressers; Jews have established cement, concrete and brickmaking industries without evoking habits of adaptation from Arabs. Anyone who examines the employment position in general will find it difficult not to conclude that its ebb and flow has been merely one aspect of the world trade-cycle, and has had little or no connection with Jewish immigration. And it is pretty obvious that, on balance, the real outcome of Jewish investment has been to increase both the quantum of Arab employment, its continuity, and the width of the economic opportunity offered. This is

especially true in the realm of government activity. For it is the Jewish effort that has made possible both the increased development of the railways and of the Public Works Department. Had the Jews not gone to Palestine in large numbers, there would have been something near stagnation in both these fields unless considerable subsidies had been forthcoming from the British taxpayer.

It is sometimes argued that the Jewish economic effort in Palestine is artificial since so considerable a proportion of it is the outcome either of gifts or of investments made from outside on non-economic grounds. We are therefore asked to regard the development as a 'hot-house economy,' the pace of which has been forced by unique circumstances unlikely to endure. The assumption which underlies this argument is that an economy is only valid when it is controlled by the impersonal price mechanism of the market. There is no reason to accept this view. What is really important is the quite different question of whether the foundations of the Palestinian economy are sound. If by this is meant the issue of whether, the national issue apart, the system can bear the cost of supporting the population whose life it is to make possible, so far there is no evidence to the contrary. It can, moreover, be argued, that the important contribution made to the war effort of the United Nations—a contribution which the Jewish citizens of Palestine made possible—is the proof that the new life made possible there in the last generation is on a higher level by every test of economic well-being and efficiency than at any previous period.

Reports of the British Administration in Palestine, or of inquiries set on foot under its auspices, have all made certain conclusions inevitable. What Sir Drummond Shiels described to the Permanent Mandates Commission, on behalf of the British Government as "the remarkable enterprise and devotion of the Jewish people"<sup>4</sup> has been almost wholly responsible for the increase of activity in industry and commerce. It is Jewish capital which enabled the Palestinian Treasury to

<sup>1</sup> For a good description, see M. Perlman, *Collective Adventure* (London, 1938).

<sup>2</sup> Report, p. 69.

<sup>3</sup> Ibid, p. 18.

<sup>4</sup> *Minutes of the 17th Session*, p. 81.

accumulate a surplus and thus embark upon important, even urgent, public works and services. Even the critics have agreed that improved agricultural technique is a Jewish contribution. Jews have been real pioneers in afforestation. Their organisations have taken the lead in fighting malaria and tuberculosis. The Jewish Agricultural Experiment Station is the efficient cause of the high standards attained in the production and marketing of fruit. So far, moreover, from the immigration of the Jews having been responsible for Arab unemployment, it is obvious that this immigration, with the imported Jewish capital which has accompanied it, has led to a demand for Arab workers for whom, otherwise, no jobs would have been available. It should, perhaps, be added that those who complain of the fact that, in the main, Jewish labour has been employed by Jewish capital, seem to forget the precise reason for the investment of Jewish capital in Palestine has been the provision of work for Jews there, had that compelling cause for such investment been absent, the derived demand for Arab labour would have been absent also. And to this must be added the fact, noted by Sir John Hope Simpson,<sup>1</sup> that, before 1914, the main safeguard against Arab unemployment was the conscription of young Arabs for military service by the Turkish Government. The fact that this conscription ceased with the defeat of Turkey in the first world-war, and that its cessation has not caused a permanent or serious deterioration in the economic position of the Arabs is, surely, sufficient proof that they have benefited, and not suffered, from Jewish immigration.

No-one suggests that the Arab *fellah* is in a position to benefit from the improvement in the economic conditions of Palestine in the same degree as the Jewish settlers. But the disproportion cannot be laid at the door of the Jews. They are no more responsible for the heavy debts, often at fantastic rates of interest, which the poor Arabs have incurred than they are responsible for the similar debts of the Indian ryots. They could not have been expected to provide him with the capital he needs both for farm machinery and for the proper treatment of the land on which he

<sup>1</sup> Report, p. 133.

works and its products. When the Arab *fellah* is, as in most cases, a tenant, his rent has risen; but it is not the Jew who has put up his rent. It is the Arab landlords who here, as in most backward agrarian communities, Hungary for example, or Yugoslavia, have never hesitated to rackrent the peasantry. The British student, with the classic case of Ireland in the nineteenth century at his door, will no more blame the Jew for his position than he will blame the farmer in Denmark or in Minnesota; he will know from the unmistakable experience of Irish land legislation that the kind of tyranny the Arab *effendi* exercise over the poor peasants can only be dealt with by government legislation. He will be aware that if the *fellah* is to be rescued from the servitude of debt, he needs cheap credit, and that only the large-scale establishment of agricultural co-operation will make this possible. If this provision is absent, the responsibility lies at the door of the Mandatory Power. So, too, does the fact that the ability to take advantage of agricultural knowledge and experiment is extremely limited. That is mainly a matter of efficient and widespread primary education, in the first instance, and of full opportunity for advanced training in agriculture, in the second. Both of these are responsibilities which rest with the British Administration in Palestine, or with the generosity of the richer Arab *effendi* to their poorer Arab fellow-citizens. It cannot be seriously expected that the Jews will assume this, in addition to their other burdens, least of all when they already contribute a high proportion of the taxes out of which Arab education is provided.

To this there must be added certain other considerations. No serious economist would suggest that Jewish immigration has been the cause of Arab unemployment. When conditions have been bad in Palestine, as in 1930, for example, they have been bad in Iraq and Syria too. The British Administration in Transjordanania admits that the low price of agricultural commodities on the world-market has made the local farmers so poor that the collection of taxes is difficult. In other words, the Arab economy of the Middle East is part of a world-economy, and the general position

in the latter is bound to have a repercussion upon the former. No investigation has ever demonstrated that depression in Palestine, when it has come, is worse in its incidence upon the Arabs than it has been upon their neighbours in Iraq or Syria. On the contrary, most of the investigations – it is true unwittingly enough – have been compelled to recognize that Jewish enterprise in Palestine has cushioned the effect of depression there compared with the Middle East as a whole. If an enquiry demonstrates that irrigation in Palestine is at once insufficiently developed and usually employed in a wasteful way, that does not prove that it would have been developed more rapidly and been less wastefully employed in proportion to the prohibition on Jewish immigration, for the evidence is that the position was worse by far before the Mandate than it has been since it came into operation. What it does show is the very different result that the British Administration in Palestine has done little for its Arab citizens in either the economic or the educational fields which remotely compares with what the Jews of the world have done for the Jews of Palestine; and that most of what has been done in these fields for the Arabs has been paid for out of accumulated surpluses in the Palestine Treasury which would simply not have been there to expend had it not been for the faith of Jews in the experiment of a Jewish home in Palestine.

Nor must one omit certain significant sociological implications of the Jewish economy in Palestine. After some two thousand years of exile, under highly special, and mostly tragic, occupational conditions, the Palestinian experiment has demonstrated that a community of Jews is no different from any other community. Given, that is, favourable conditions, its members will distribute themselves into trades and professions in much the same way as the members of any other community. They make good farmers. They undertake heavy manual labour. They become adept in a great variety of crafts which have lain outside their European experience. They make fine soldiers and trustworthy police. They take to the outdoor life of the countryside as successfully as to the indoor life of office or factory in the town. They can adapt themselves with ardour and

goodwill to the socialist economy of a co-operative colony as to the individualist economy of private enterprise, whether this expresses itself in the small one-man shop, or a great corporation like that which is mainly responsible for electricity supply in Palestine. To have shown in this way that what are often called "Jewish characteristics" in the typical economies of Europe and America are no more than conditioned responses to an imposed environment behind the compulsions of which there are long centuries of history is a matter of quite primary significance. Its wider implications lie outside the field of this essay: but at least they make it evident that there is nothing in either the nature or the behaviour of the Jew which makes him unfitted to be a factor in the improvement of life in Palestine. And if this is true of Jews who have gone to Palestine from a world whose experience is so different from what work in the Middle East involves, it needs no persuasion to agree that Jews brought up with Palestine as the vital background of their memories are still more likely than others successfully to adapt themselves to the claims it makes upon them.

Everyone knows that Palestine is a small country, about the size of Wales; that a great part of it is arid desert; that though, with Transjordan, it may once have contained upwards of four million inhabitants, it now contains only about one and one-half millions, of whom almost one-third are Jews: and that by far the larger part of the Jewish population consists of immigrants from Europe, mostly poor, and in a high proportion the victims of persecution, both in Eastern and South-Eastern Europe in particular. It is a matter of common knowledge, also, that among the survivors who have escaped the savage barbarism of Nazi attack there are many thousands whose tenuous attachment to life depends upon their hope of being able to enter Palestine, there to rebuild an existence they cannot but look back upon with fear and dread. It is also well known that, up to the issue, on behalf of the British Government, of Mr. Malcolm MacDonald's White Paper of 1939, it was the legal obligation of Great Britain to encourage Jewish settlement in Palestine so long as the

position of the Arabs was not thereby prejudiced. Up to some such time as the Arab outbreak of 1929, moreover, it was generally assumed that only what it was usual to term the "economic absorptive capacity" of Palestine was a legitimate barrier in the way of Jewish development. That was certainly the view of the Permanent Mandates Commission of the League of Nations. It was the view of the statesmen mainly concerned in framing the Balfour Declaration, Lord Balfour himself, Mr. Lloyd George, who was then Prime Minister of Great Britain, Mr. Churchill, and Field Marshal Smuts. It has been the constant view of the British Labour Party, re-affirmed as recently as its Conference discussion in Blackpool, in May, 1945; there is, indeed, no single, important member of the Labour Government of which Mr. Attlee is the Prime Minister who is not, either explicitly or by implication, bound to this view. A long series of pronouncements over many years have made it abundantly clear, also, that this was the view of the Jewish future in Palestine which was held by the Government of the United States.

Certain obvious consequences follow from this attitude. If there were to be more Jewish settlers, there must be the opportunity for the Jews to purchase more land, so long as this purchase did not adversely affect the Arab inhabitants. This land could be purchased from Arab landholders if this did not mean dispossession of Arab *fellaheen*; or it could be bought from the State lands, whether in the occupied area, or in those parts which are unoccupied. Nothing, moreover, in the terms of the Mandate suggested, directly or indirectly, that Jewish immigration was limited, not merely by the economic absorptive capacity of Palestine, but also by Arab consent to its continuance, still less by consent of the Arab Higher Committee – a group of *effendi* dominated by the Grand Mufti, a satellite of Hitler and Mussolini, until 1939 – and even less by the consent of the League of Arab States, which was only called into existence during the second world war by British diplomatic pressure. The effect of Jewish settlement was important. It was not to prejudice Arab well-being. That did not mean the well-being of the rich Arabs

in Palestine, but of the whole Arab community. And since it was one side of a dual role which the Mandatory Power was expected to play, the negative role of preventing Jewish settlement harming the Arabs, and the more positive role of enabling the Jewish 'Home' progressively to be built. The meaning to be attached to the conception of a 'Jewish National Home' lies outside the scope of this essay. But it is necessary because of the argument which follows to emphasize that it never assumed a fixed limit either to the number of Jewish immigrants, or to the total area of Palestine which it would be open to them to purchase and develop. It assumed only that the evolution of a National Home in Palestine should not injuriously affect its Arab inhabitants. The purely static conception of the Jewish 'Home' began to be formalised in the British White Paper of 1930,<sup>1</sup> though there is a considerable administrative history behind that formalisation. It was fully expressed in the White Paper of 1939, the substance of which has been upheld by the British Government despite the view of the Permanent Mandates Commission that it was *ultra vires* its authority as the Mandatory Power. With the coming of the second world war, and the collapse of the League of Nations, the conflict between the view of the British Government and that of the Permanent Mandates Commission has been unilaterally decided for the time being by the British Government, in its own favour. The decision of the British Government, after it had received the unanimous report of the Anglo-American Commission, to embark upon a federal experiment in Palestine, will have to be judged by the degree to which it makes possible the resumption of a dynamic conception of the 'Jewish National Home'. This, in its turn, is conditioned upon the assumption (a) that the Commission approves the active resumption of the purposes set out in the Balfour Declaration and the terms of the Mandate of 1922, and (b) that the United Nations Organization approves of a decision by Great Britain, as the actual administering authority, to see that these purposes are fulfilled. Whether these assumptions are valid, only the future can tell.

<sup>1</sup> *Statement of Policy in Palestine*, by H M G in the United Kingdom. Cmd. 3692, 1930.

If they are valid, it is reasonable to argue that a far more ample and positive economic policy in Palestine is imperative. It is not enough for the British Government predominantly to act on the one hand as the sceptical observer of Jewish initiative, and, on the other, as the eager recipient of Arab complaints. It has itself positively to undertake the encouragement of economic progress in Palestine, and to see that the personnel of its administration there believe in the necessity of this encouragement. It has to guard against the danger that its policy in Palestine is subordinated either to its immense interests as a Moslem power, its economic concern for the future of its oil supplies (one of the grim shadows which haunt the Palestine drama) or to its strategic concern in the Middle East as a vital link in the communication between India and the Mediterranean round which so much of British defence policy is built. The experience of the years between 1922 and 1939 makes it evident enough that this subordination has been the unstated major premise of British action in Palestine ever since the League of Nations offered the Mandate for Palestine to Great Britain in 1922. So long as this frame of mind persists, a 'Jewish National Home' in Palestine is likely to remain an empty phrase with no prospect of fulfilment.

But if we are entitled to assume that there is a genuine desire to make the 'Jewish National Home' a reality, the next steps are given to us by the experience thus far gained.

1. An immediate hydrographic survey of the whole of Palestine and Transjordan is imperative. This needs to be thorough and complete, and not the kind of survey by small sample which has thus far been undertaken.

2. On the basis of such a survey, large-scale public irrigation works should be begun without delay. If these are shown, as specialists like Dr. Lowdermilk claim they will show, to make possible cultivation of land in barren areas like the Negev and Transjordan, it becomes obvious that large additions to the population of these areas become possible. It is then undesirable to maintain the present administrative separation between Palestine and Transjordan, which was, in any case, a dynastic expedient introduced by Great Britain on

political grounds.\* The new cultivable land should remain public property to be held on lease only, and leases should be granted to those who are actually to work the land and not hold it for speculative re-sale.

3. Irrigation works of this character, and other large-scale development works, should be financed out of a public works budget which should be kept separate from the normal budget of current expenditure dependent upon the revenue derived from taxation.

4. Co-operative marketing and standardized grading of primary commodities should be made compulsory for all producers, Arab or Jew.

5. Cheap credit facilities should be made available to small producers, and steps should be taken to limit the interest upon past debts owed to private money-lenders.

6. Compulsory elementary education for all Palestinians should be enforced. It is also necessary to establish a national medical service in Palestine, financed by contributions from its inhabitants. It is desirable to prohibit private practice in this field and to impose minimum standards of hygiene and housing under penalty.

7. Future land settlement should be on communal rather than on individual lines. The available evidence appears to suggest that the former method encourages more scientific farming, better stocking, and a better use of productive machinery. Where it is possible to secure mixed collective farms of Arabs and Jews, every effort should be made to encourage them.

8. The encouragement of trade-unionism should be made a specific function of the Government in Palestine, especially among the Arabs. For this purpose a statute should be enacted comparable in character to the American National Labour Relations Act (the Wagner Act). Where possible, mixed Arab-Jewish unions should be formed and encouraged.

9. Efforts should be made to develop higher education among the Arabs, especially in

\*Since this was written the Foreign Secretary to Great Britain has taken the extraordinary step of recognizing, in the midst of the hearings of the Anglo-American Commission, Transjordanian independence. It is difficult to see why this was in any case desirable, and especially at the moment chosen for the purpose.

fields of scientific and technological importance. If possible, government scholarships for this purpose should be made available in the appropriate departments of the Hebrew University which should be urged to cater for Arab students and to make provision for instruction in Arabic.

10. The limit to immigration should be set by economic absorptive capacity. The Government should plan for full employment, and for this purpose should be ready to engage on large-scale public works to meet periods of possible depression.

11. Schemes for communal improvement in Palestine should not, as in the past, be made dependent upon finances available whether from the annual revenue or from a loan the amortisation of which is secured upon the revenue. This attitude is bound to mean either that the main future of Palestine depends upon large-scale Jewish investment, taxation from the revenue thus produced being the main source of Arab development, or, if the scale of that investment is small, it means a painful slowness in the rise of general well-being in Palestine, as well as a contrast between the hope available to Jews through support from outside, and the hope available to the poorer Arabs. This becomes an important source of friction between the two communities. It is far wiser to begin the new epoch of co-operation with a large loan for a long period at a low rate of interest, backed by the authority of the United Nations Organization.

12. It is important to recognize from the outset of any attempt at a really new start, that there is little hope that this will be successful if Palestine is to be saddled with the burden of any considerable number of functionless landowners. They should either be bought out at reasonable rates of compensation, or so taxed that they are rapidly induced to sell. The land thus released should not be resold but let on lease by the Palestine Government on the condition that any renewal of a lease is subject to proof of efficient farming. For this purpose, an effective system of expert inspection is necessary; but with this inspection should be associated mixed committees of Arabs and Jews in advisory capacity. It must be made unmistakably clear, however, that

responsibility for the termination of a tenancy is in all cases a matter for the Government alone.

13. The methods of taxation now in vogue in Palestine are mainly an obsolete legacy from the Turkish régime. At the earliest possible moment, the Economic Council of the United Nations Organization should be invited to reorganize the whole system of taxation upon a more rational basis.

14. A Development Commission, such as Sir John Hope-Simpson envisaged fifteen years ago,<sup>1</sup> should be created with the function of advising the Government on all economic experiment. It should have equal Jewish and Arab representation, though its chairman should be a civil servant with high qualifications in the relevant economic field. The Development Commission should be the final authority on matters like the utilization of land, the location of industry, and the building of major roads. It should also have the power to stabilize urban growth, and to act in relation to existing local authorities, both in malfeasance and in non-feasance, in a way comparable to the relation between the Ministry of Health and the local authorities in Great Britain.

15. Far more attention should be given to the development of, and training for, light industries. One of the great needs of Palestine is a more diversified economy. At present, it is far too dependent on the markets available to the primary producer, who is himself largely controlled by the price obtaining in the world-market. It is probable that there is a considerable future for the manufacture of furniture, pottery, many forms of plastics, and some forms of the chemical industries. The more speedy the development of these, the more adequately cushioned Palestine will be against a possible agricultural depression. While the present world-shortage of food seems to promise a safe market for at least some time, it is important to remember that this shortage is, on past experience, likely to be made good more swiftly than we now imagine. Unless there is a permanent rise in the standard of living in Europe and the Middle East, it is highly probable that Palestine will face considerable economic difficulties four or five years

<sup>1</sup> Report, p. 144.

from now unless a larger proportion of its primary products can be consumed in the home market.

16. It is difficult to think that the economic future of Palestine can be considered as a matter independent of the future of its neighbouring countries. Closer relations are, in any case, likely on political grounds; and these are bound to have their economic repercussions. The observer is inevitably tempted to think that few things would be so likely to prove of enduring benefit as a T.V.A. for the Middle East which would make possible that increase in output per man-hour that is so urgent; and would make Arab educational advance as swift as it is necessary. One of the most real problems of this complex area is that economic life is so insecure and unstable that the frontiers of any part of it are a gate opened by a constant stream of nomad and unskilled labour which flows now here and now there as news of jobs travel around. This illegal immigration is bound to grow if the rate of Palestinian development were such as to offer seriously greater opportunities than those open to Arabs in Syria, Iraq or the Lebanon. No government in Palestine can therefore remain indifferent to the need for measures to speed up economic progress in those areas; and the best way to fill that need is to make provision for common action in the economic realm. The very backwardness of Arab production in the countries round Palestine makes that common action more, and not less, urgent.

17. A word, finally, ought to be said on the probable character of Jewish immigrants into Palestine in the next decade. For the most part, it is likely to consist of four main categories:

- (i) There will be old people and invalids, often the victims of Nazi barbarism, who come to Palestine to die. So long as they do not become a charge upon the community, their entry is justified on humanitarian grounds alone.
- (ii) There will be adult persons whose experience in Europe, especially since 1933, makes them anxious to settle permanently among their own people. Of these, apart from skilled craftsmen, certain professional types, like the doctor, the dentist, the engineer, the chemist, have an obvious

value. It is at least dubious whether a high priority, on any immigration schedule, ought to be given to intellectual workers, lawyers, for example, or the old-fashioned Talmudist from Eastern Europe, unless they are willing to be retrained for some practical vocation.

- (iii) Children whose parents have been the victims of Nazism. It is outstandingly desirable in these cases that each child should be placed with, and grow up in, one of the Jewish collective colonies. This makes it far more likely that the child will be able to overcome the psychological problems of its European experience.
- (iv) Adolescents who have escaped during the war and had some training in organizations connected with the Youth Aliyah before their certificate of entry has been granted. It is greatly to be hoped that this category, also, will, so far as possible, be merged into the collective colonies. Their training has already fitted them for this type of life; and, with the inevitable individual exceptions, they are the types most likely to fit into, and co-operate with, the remarkable effort these colonies represent. Since the collective colonies, moreover, are already a social experiment of high importance, the priority of their call upon potential immigrants ought to be rated as of outstanding significance. It is not the Jew with the gift for individual enterprise who is needed in Palestine so much as the Jew who fulfils himself as the member of a team.

The economic future of Palestine is an issue dependent, at every point, upon political decisions which will have to be made within a very brief period. What those decisions should be have not been here my concern; they belong to a different section of this volume. But there is one principle I can at least affirm which is relevant to all the political decisions which lie immediately ahead. There is no evidence to show that the attempt to make Palestine a 'Jewish National Home' upon the basis of the Balfour Declaration has had any deleterious effect on Arab well-being; on the contrary, it is abundantly clear that it has helped, and not hindered, Arab advance. To

this must be added two other things. In an experiment of the scale and importance of that attempted in Palestine, success largely depends upon faith in its validity in the major officials concerned; no-one can have watched at all closely the working of British administration without coming to the conclusion that a considerable proportion of the major officials, both in London and Jerusalem, have lacked that faith. It is otherwise impossible to explain a White Paper like that of 1939, for example, with its misrepresentations, its evasions, its calculated obscurities; its grudging admissions, and its obvious dislike of the responsibilities its authors had to face. No-one who approached a great mission in that spirit could even have hoped seriously to fulfil it.

The second thing to note is that the implication of a 'Jewish National Home' in Palestine is a thorough-going reorganization of the internal relations of a semi-feudal Arab society in which the privileges of a small group of rich *effendi* are deeply involved; and this, in its turn, is bound, if it continues, to have vital repercussions on the whole social framework of the Middle East. This is the real source of the resistance to large-scale Jewish immigration. The Jew brings with him Western ideas, often Western socialist ideas, which cut right across a traditional historical pattern the beneficiaries of which seek at any cost to defend their

claims. They therefore mobilize both religious fanaticism and nationalist passion to arrest changes in which they see the threat to their privilege, and seek to use the dislike of the masses for change before they see that the change is to their advantage. Among other mistakes, one of the grave errors of British policy in Palestine has been its attempt to accept the opposition of the *effendi* to the 'Jewish National Home' at their own valuation. That is why there have been weakness, vacillation, and appeasement, where there should have been directness, resolution and strength. If the Palestinian experiment is to have any chance of success in the next decade, it must be made decisively clear that there is no going back at any point on the full implementation of the principles set out in the Mandate of 1922. Novelty in the field of politics demands not less the courageous heart than the clear mind. In the quarter of a century since the Balfour Declaration the policy of Great Britain in Palestine has had neither. Until it has come to see that, without these qualities, it only deepens one of the supreme historical tragedies of which we have knowledge, its statesmen do an ill-service to civilization by accepting responsibilities they hesitate to fulfil. And at a time like our own, to fail in a task of this kind is to risk a betrayal the future will find it impossible to forgive.



## Jewish Palestine: The Social Fabric

Palestine offers unique opportunities for the study of social phenomena. Their background is two-fold: the impact of a new economic dynamism upon a stagnant form of society; and the emergence of a new pattern of Jewish corporate life out of the variety of cultures and *milieus* represented by the Jewish Dispersion. It is with the latter aspect that this article is concerned.

The significant fact of modern Palestine is the transformation of the Jew. It has gone hand in hand with the transformation of the country. In the sphere of political organisation, as distinct from social relations, Jewish achievement took longer to mature. It was the individual Jew who reflected the change most noticeably, immediately his contact with the land was renewed. This contact had an almost magic effect upon Jews to whom life had been revealed in nearly every phase of material and spiritual degradation. Their confidence was restored. Those who had hitherto regarded themselves through the eyes of others, seemed to lose their self-consciousness. They were now men whose sense of freedom found expression in regained physical and moral courage.

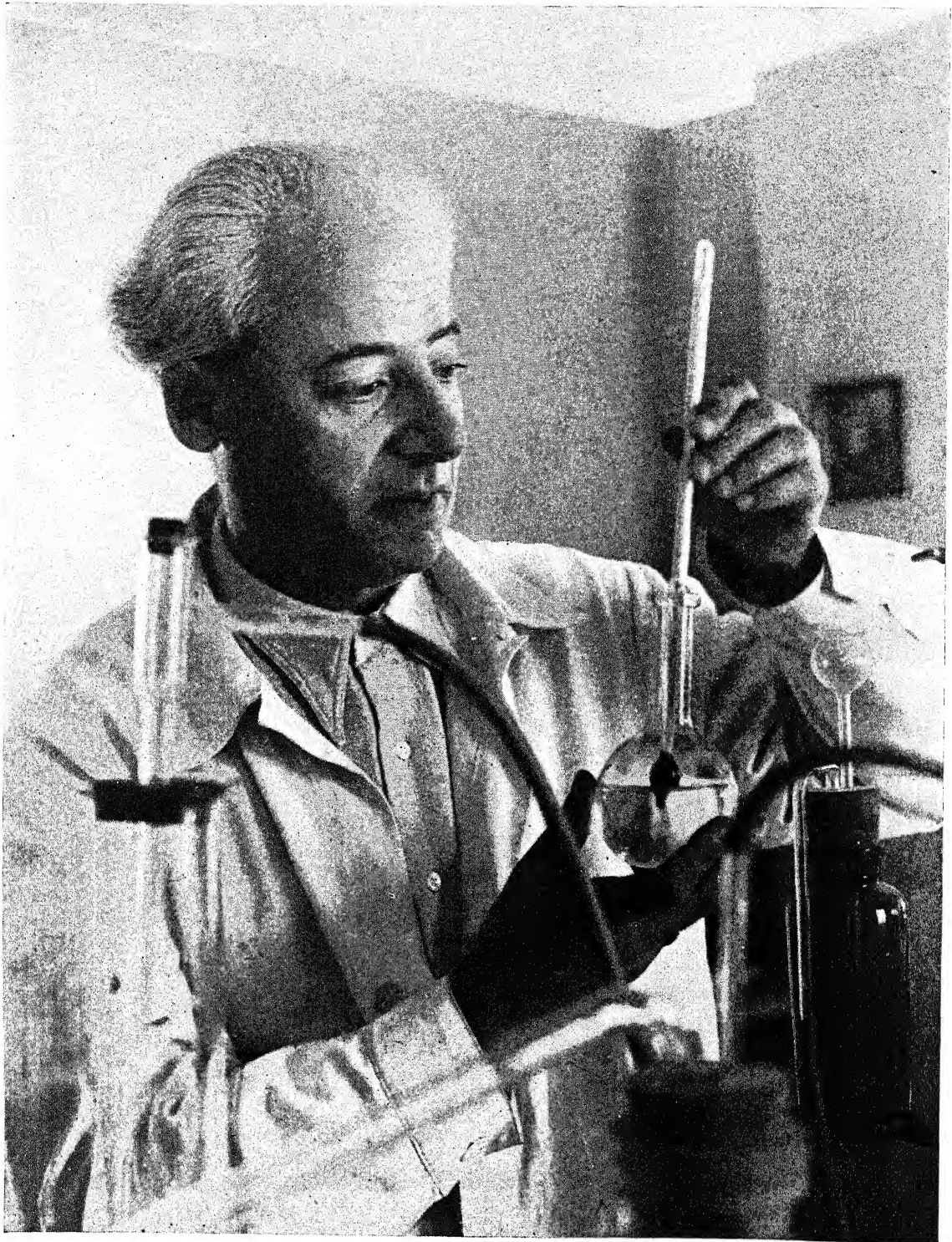
The pioneer of Jewish re-settlement five or six decades ago found an environment where robbery and murder were the order of the day. He cultivated his instinct of self defence, yet without descending to the level of his surroundings. If he succeeded in doing so, it was largely owing to two reasons. First, Jewish history and teaching had imbued him with a sense of the futility of violence. He might resort to it in desperation, but he would do so against his spiritual convictions. And, second, he felt that whatever attitude he might adopt in Palestine, it would have to be final. For the Jew in the Diaspora, in the face of a largely hostile environment, there was at least the possibility of escape in migration, conversion, assimilation or ordinary mimicry. In Palestine there was no possibility or urge of that kind. In that country, with which was bound up the past and future of his people, he had to assume personal responsibility for success or failure.

### Social Transformation.

This transformation of the individual found ex-

pression, at the same time, in the changed social structure of the new community. For the first time since the Dispersion, Jewish life came to be based upon a strong working-class. Under the impact of the twin forces of necessity and idealism, there has emerged in the course of two generations a well-balanced economic and social structure which is radically different from all that is rightly or wrongly associated with Jewish economic life in the Diaspora. It may be unnecessary to stress that Palestine shows the highest proportion of Jews engaged in agriculture anywhere in the world: for many centuries Diaspora Jewry was denied access to the land. It is less well known that the occupational change-over among Jews going to Palestine is not only from middlemen and petty traders into workers, but also, in cases of immigrants of working-class descent, from a limited number of traditionally "Jewish" occupations like tailoring, towards the whole variety of industries within the range of a nation's production.

As a rule, the urban proletariat all over the world is recruited from the peasantry. The bulk of the Jewish working-class of Palestine, however, originated in the middle class and de-classed strata of Jewish society in eastern Europe. Many left urban occupations for life on the land, enacting the vision of a restored Jewish peasantry in the Land of Israel. Others became roadmakers, bricklayers, industrial workers. This transition to a life of physical labour, if a necessity to many, was in most cases also matched by an act of will. Although the pressure of circumstances has undoubtedly played its part, it was still a personal decision and revolution, and to explain it in purely economic terms would be as futile as to seek a similar explanation of the whole phenomenon of Jewish regeneration and why its location was Palestine and no other place on the face of the earth. It is true that in Palestine, suffering as it does from the neglect of many centuries, hard work is incapable. Yet without the ideal of a Jewish Homeland to inspire them, the young Jewish pioneers would scarcely have submitted to untold hardships: indeed they would not have gone there at all.



Refugee type: Insulin chemist

*Photo JEWISH AGENCY FOR PALESTINE*

Modern Jewish settlement began in the 'eighties under the Turkish regime, but only got into its stride under the British mandate in the 'twenties. Jewish colonisation became a serious proposition, and a solid foundation of the Jewish Homeland, only after it was linked with Jewish labour. This was made possible by the immigration of workers (or those who wished to be workers) following 1905 and in the 'twenties. Theirs was by far the most decisive contribution to the rebuilding of Palestine. It was they, and the leadership they brought forth, that more than any other factor determined the character, and sometimes the pace of the development.

#### The Jew as a Worker.

Thus, the ideas that inspired the social change-over in Palestine were largely those of the politically alert immigrants of 1905 and 1920-25. Coming from eastern Europe, where social conditions were in a state of flux, they were full of reforming *élan*. And they knew well how precarious, and artificial, was the relationship between the Jews and the population in the midst of which they lived, and how little reliance could be placed even upon progressive movements by a homeless minority eternally dependent on the favours of its hosts. When the forerunners of the Zionist labour movement set out to build afresh in their ancestral land, they were fully conscious of the important part the worker had to play in its reconstruction. And, just as they preached the lessons of Exile and Return, they tried with no less force of conviction to imbue their followers with the idea of the dignity and significance of manual labour. What seemed at first to be sheer economic necessity, thus became a moral virtue and a national duty. Not only was a new society to be built, but it was to be a *better* society. Indeed, if there was to be a Jewish nation, it would have to be a nation of workers. If the Jews concentrated on ownership and management, Palestine would but reproduce the worst features of the Diaspora. If Jews were to leave the hard work to the 'native' population, Jewish immigration would soon stop, and what might grow into a well balanced Jewish polity, would be reduced to a Jewish plantation. Grafting a small upper class of Jewish owners on to a large body of cheap Arab labour would be a mockery of the Jewish national revival.

The call for "Jewish labour" has often been misunderstood or distorted. There was no Arab proletariat in existence when Jewish settlement began. Many *fellaheen* were willing to work as seasonal labourers in orange-groves when their own farms did not require much attention. To be sure, thousands of them were given work in those Jewish villages and rural towns where hired labour is permitted. But practically all that the Jews created in the economic sphere was achieved not by extending, or improving on, old-established economic positions, but by creating something entirely new. It stood to reason that, whilst a call was going out to Jewish youth to revolutionize its outlook and devote itself to a life of labour, it should also be given employment in these newly-created economic positions.

The logic of this argument was, of course, the grammar of Zionism. If the Jews were to escape minority-life in, and through, Palestine, and to rid themselves of the unhealthy features of Jewish economic life in the Diaspora, then the way for the absorption of new immigrants had to be prepared and, at the same time, colonial exploitation, so abhorrent to the Jewish national movement, had to be excluded. The standard of living of the Arabs was to be raised as the process of Jewish resettlement gathered momentum. Once the Arab standard of life has approached that of the Jews, the need for Jewish labour to defend itself against the competition of cheap labour will disappear.

#### Occupational change-over.

The fact that Jewish immigrants into Palestine did not, as a rule, find ready economic positions to fill served to speed, and broaden, the occupational change-over. Out of 104,000 workers covered by a partial census in 1937, 86,000 had changed their pursuits in Palestine: 2.4 per cent. engaged in agriculture in the Diaspora as against 23.4 per cent. in Palestine; only 1.6 per cent. were building workers abroad, as compared with 10.6 per cent. in Palestine; less than 1 per cent. were engaged in transport trades as against 6.3 per cent. in Palestine; over half of the total Jewish population belonged to the wage-earning proletariat, and manual workers represented 78 per cent. of Jewish wage-earners in Palestine (compared with 22 per cent. among Jewish wage-

earners in pre-war Poland or with 44 per cent. among the general wage-earning population in the U.S.A.).

The transition from the middle class or de-classed strata to the working class, from commerce and lighter occupations to heavier manual work, including the transition from town to country, is also illustrated by the following table (compiled during the 1937 labour census) which compares the occupations of Palestine Jewish workers with those of their fathers abroad:

*Occupational Distribution  
of Palestine Jewish Workers  
and their Parents Abroad.*

	Palestine Workers' Fathers Abroad		Palestine Workers	
	Number	%	Number	%
Agriculture	3,904	3.8	24,419	23.4
Building	1,924	1.8	11,001	10.6
Transport and Heavy Industry*	8,984	8.5	22,626	21.6
Light Industries †	7,834	7.5	7,863	7.5
Commerce	50,105	48.2	—	—
Factory owners	2,398	2.3	—	—
Various professions	13,084	12.6	2,601	2.5
Miscellaneous	15,889	15.3	35,612	34.4
	104,122	100.0	104,122	100.0

\* Woodwork, building materials, metal, electricity, etc.

† Weaving, needlework, leather, foodstuffs.

At the beginning of 1943, 113,000 Jews or 21.8 per cent. of the Jewish population were living in rural areas; 3.6 per cent. were serving in the forces, and about 75 per cent. were resident in towns. Of the Jewish wage-earning community in June, 1943 (numbering 212,000) 28.8 per cent. were engaged in industry and handicrafts; 13.2 per cent. in agriculture; 9.2 per cent. in building and public works; 3.8 per cent. in transport; 11.3 per cent. in commerce; some 10.8 per cent. were office clerks and civil servants; 9 per cent. were serving in the armed forces, supernumerary police, etc.; 6.1 per cent. were in domestic service; 7.6 per cent. in the liberal professions; the remainder in various occupations. About 60 per cent. of the wage-earners were employed in the primary branches of the national economy. The percentage of agricultural workers has declined

during the war (by 6 per cent. since 1938) largely owing to the stoppage of citrus exports and the resulting crisis in the citrus industry the effects of which will not be eliminated for a number of years.

The growth of the Jewish working class in relation to the increase in the general Jewish population is shown in the following table prepared by the Department of Statistics of the Jewish Labour Federation:

*Growth of Palestine Jewish Working Class*

	Workers (excluding Workers' Wives)		Jewish Population	
	Number	Index	Number	Index
End of 1926	25,000	100	150,000	100
End of 1937	107,000	418	396,000	264
End of 1938	112,000	448	411,000	274
End of 1939	120,000	480	445,000	297

*Collective Enterprise on the Land.*

The immigration of Jewish workers, it should be remembered, preceded the emergence of the rudiments of capitalist economy in Palestine. This fact, taken together with the intense social consciousness of the Jewish immigrants, goes a long way to explain some of the peculiar features of the Palestinian Jewish working-class. One of the most striking amongst them is that the Labour Federation (Histadruth) comprises, side by side with wage-earners who are employed in ordinary capitalist enterprises, independent workers who own, and run, their own economic establishments, be they farms, industrial co-operatives or enterprises belonging to the Labour Federation.

Thus, collective enterprise has, in a considerable section of the country's economy, superseded what is known as private enterprise. It may be added that, broadly speaking, this has been done without sapping personal initiative and inventiveness. These have, however, been diverted from the purposes of private gain to those of improving the standard of living of the whole community. After thirty years of trial and error, there exists to-day within the agricultural and industrial Jewish economy of Palestine, a socialized

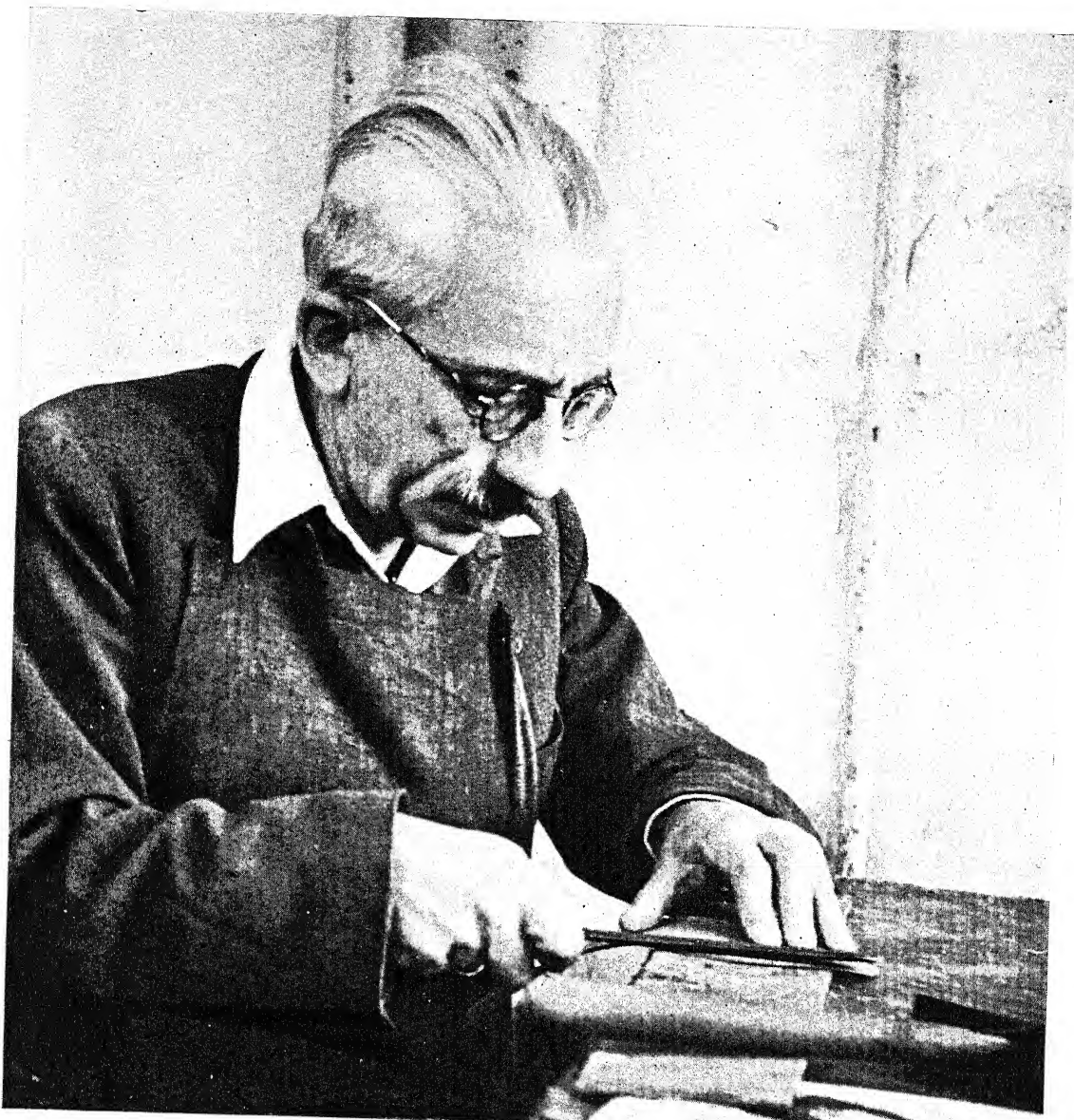


Photo JEWISH AGENCY FOR PALESTINE

Refugee type: A former bank-clerk

sector which is based on the principles of co-operation and non-exploitation.

The scope, and strength, of this sector may be gauged from the following figures. The number of workers in agricultural settlements—both collective and co-operative—was, in the middle of 1944, some 26,000, while institutions controlled or influenced by the Labour Federation—in-

cluding building, transport and industrial co-operatives—employed 14,000. Thus the number of workers employed in purely Labour enterprises was about 31 per cent. of the total number of Jewish workers actually employed. Taking the value of production as a criterion, the share of the Labour sector in total Jewish production is, in certain branches of economy, even more



impressive. In mixed farming, as well as in road transport, it amounts to 70 per cent.; in building enterprises it is 66 per cent., in industry 10 to 12 per cent., and in citriculture 6 to 8 per cent.\*

In most cases, especially in agriculture, the forms of economic organisation coincide with patterns of social life. Jewish socialized agriculture in Palestine has produced a new type of working man—neither farmer nor hired farm-hand in the ordinary sense. He is a free and equal partner in a farming community on national land, in which the employment of hired labour is disallowed. There are roughly two types of such communities. One, the *Moshav*, is based on individual farms, but all farmers are pledged to mutual assistance in case of illness or accident. At the same time, the mechanical cultivation of grain fields, as well as the sale of their produce (and the bulk purchase of supplies) are organized co-operatively. About 15,000 people live in this type of village. The other type, the *Kibbutz* or *Krutzah*, comprising over 30,000 people, is founded on communal ownership in both production and consumption. All property, except personal belongings, is held in common, all work is pooled. The management is democratically elected and, basing its authority on the spiritual and social atmosphere of the group, it aims at drawing from each member the utmost of which he is capable in order to provide him, within the limits of economic possibilities, with the maximum of his requirements.

There is complete equality between the sexes, and the education of the children is the responsibility of the community. In most cases the children live apart from their parents, a fact which makes the daily meeting between parents and children, when the day's work is done, a source of joy and, in a way, the central event in the everyday life of the *collective village*. Practically all labour settlements are based on mixed farming, with the emphasis on one branch of agriculture or another according to the climate and soil conditions of each particular place. There are several collective settlements which do not confine themselves to agriculture, but manufacture preserves, textiles, agricultural

tools, woodwork, bricks and books. Thus some of these communities, whilst essentially retaining the character of a rural settlement, have in fact become unique economic entities, diversified and self-supporting, combining farming with a measure of industrial activity. Other settlements, especially in their formative stage, send some of their members to work 'outside,' i.e. in privately owned groves and workshops, in order that they may bring a welcome addition to the income of the group until such time as it is well established and self-supporting.

#### The Role of the Labour Federation.

Both 'independent' and hired workers are members of one labour organization: the *Histadruth*. Thus the customary division between urban and rural workers is largely avoided, and artificial distinctions based on the degree of economic security of workers are constantly being exposed and challenged wherever they appear. Industrial workers in the towns and drivers who run their own buses under the aegis of co-operative transport companies, agricultural labourers on privately-owned citrus plantations as well as members of co-operative or collective settlements, they are all conscious of belonging to one large community laying the foundations of a homeland for homeless Jewish masses and striving to make the country as a whole a better place to live in. This has been largely due to the unique conception of the *Histadruth* not only as a labour organization but as a great instrument of national planning. Its numerical and economic importance, its enterprising spirit and its combination of a sense of practical realism with an idealistic urge, have made it the power-house of Jewish Palestine. The Federation is a Janus-headed formation: on the one side a trade-union organization (*Histadruth*) and a powerful factor in labour relations; on the other, a juridically established company (*Hevrath Ovdum* which means "Workers' Society") and a considerable force within the national economy. As a trade union organization it, naturally, fights for maintaining and improving the working conditions of its members. As the *Hevrath Ovdum*, it owns enterprises, undertakes and directs economic activities and constitutes the parent body of all workers' settlements and labour institutions. There is

\* The above figures are taken from "Jewish Labour Economy in Palestine," by G. Muenzner (Gollancz), 1945, pp. 13-14.

identity between the *Histadruth* and *Hevrath Ovdim* as regards membership and management. The integration of all this variety of economic units into one pattern is designed as a guarantee against sectional interests and as a measure of control on behalf of the common weal. In addition to these two main features, the *Histadruth* comprises within its framework a whole series of social services like health and insurance, as well as cultural services, press, publishing and the like. The economic activities of the *Histadruth* are conducted either directly through its own institutions and subsidiary companies or in the shape of autonomous co-operative undertakings. The latter method is exemplified in the agricultural settlements, or in urban industrial workers' co-operatives such as are common in many countries. The former method may be illustrated by such institutions as the Workers' Bank, which had a capital of £76,000 in 1943; *Shikun*, the housing corporation of the *Histadruth*; *Nir*, an institution granting intermediate credits to agricultural settlements; *Mekoroth*, a limited company to utilise water resources for intensive cultivation; *Yakhin*, a company undertaking agricultural work, especially in the citrus belt; *Tnuvah*, the central marketing society for the agricultural produce of labour settlements; *Hamashbir Hamerkazi*, a kind of Co-operative Wholesale Society, supplying the labour settlements and a chain of local consumers' co-operatives; and *Solel Boneh*, the building contractors' company of the *Histadruth*.

#### Socialized Industries.

*Solel Boneh* is a powerful factor within the country's economy. As a building contractor *Solel Boneh* is by far the largest enterprise in the building trade in Palestine. In 1942 it executed building operations to a total value of £2,000,000 in Palestine and the neighbouring countries—largely army orders, for practically all civilian building was suspended during the war. Its capital at the beginning of 1944 amounted to about £750,000 and its investments to 1.3 million, not counting hidden reserves in real estate, machinery and affiliated companies.\* About 30 per cent. of its total capital is invested in enterprises connected with building contracting, whilst another 30 per

cent. is invested in industrial undertakings, 12 per cent. in stone quarrying and allied enterprises, 12 per cent. in commerce, 4.5 per cent. in transport, 4.5 per cent. in industrial enterprises in which it is a partner and 2.5 per cent. in maritime enterprises.

Not content with its role as one of the largest building contractors in the Middle East, *Solel Boneh* has set beside the industrial undertakings of groups of workers in town and country, a series of centrally owned, socialised industries. A number of industrial works, assembled under a subsidiary company *Koor*, belong to *Solel Boneh*, including quarries, the Phœnicia glass works, the Vulcan foundries, the *Hamegapper* rubber and tyre-retreading works, as well as brick works, a plant for cement tubes and tiles, and several other undertakings. The shares of *Solel Boneh* are in the hands of *Hevrath Ovdim*, the juridical form (and holding company) of the *Histadruth*. In this way the control of this unique concern is assured to the labour organization which is anxious to see the country's resources, including man-power and skill, developed to the utmost in order to increase its capacity to take more immigrants. The *Solel Boneh* industries, and a few other factories owned by co-operatives or federations of agricultural settlements, however, account only for about 9 to 10 per cent. of the whole industrial working class. The majority of Jewish factories and workshops are privately owned.

#### Industrial Productivity.

A remarkable feature of Jewish economic transformation is the rapid growth of industrial productivity. At the beginning of the century only an insignificant number amongst the 60,000 Jews who lived in Palestine at the time were engaged in industry. By 1944 over 60,000 were engaged in industry alone. In relative figures it meant an increase almost *ex nihilo* to nearly a third of the total of Jewish earners. The greater part of Palestine's Jewish industry still consists of small workshops and enterprises, but the last two decades, and especially the war years, have seen a steady expansion of existing factories. In 1930 the industrial enterprises employing 100 or more workers accounted for about 10 per cent. of the total number of persons engaged in industry; to-day they comprise about a quarter of the

\* "Jewish Labour Economy," *op. cit.*, p. 96



Refugee type: Prague clerk as cosmetic worker

*Photo JEWISH AGENCY FOR PALESTINE*



industrial working class. Hand in hand with the growth of the size of undertakings went a rise in the average productivity of the individual worker and an improvement in the quality of his output. The fact that productivity has risen may be deduced from a comparison of various censuses of industry which show that not only has the average number of persons employed in each enterprise increased, but that the relative increase in output has been greater than that of the numbers of persons employed. The number and proportion of women in industry increased during the war, and part of the increase has come to stay. The number of skilled and semi-skilled workers has grown considerably with the expansion of metal, machine-tool, chemical and textile industries. Naturally, greater standardization at the expense of skilled workmanship is one of the penalties of war. Moreover, Palestine's industries already to-day require additional numbers of skilled workers in all stages of production and design, if the capacity of industry to compete both at home and abroad is to be improved. A Government which is concerned about Palestine and its future would do well to organize schemes of technical training of labour in accordance with the changing industrial needs and possibilities of the country. It should also devise plans for harnessing and adapting the talents of technicians and scientists among newly arrived immigrants to the needs of extension and improvement of industrial processes.

#### A Youthful Community.

Another striking feature of Palestine Jewry is its youthfulness and vigour. In 1937, the Palestine Royal Commission wrote:

"Twelve years ago the National Home was an experiment: to-day it is a 'going concern.' . . . The Jews in Palestine, to begin with, are happy. . . . Whether it be the Jew who has been driven from a comfortable life in a cultural *milieu* and is now digging all day in the fields and sleeping in a bare cottage, or whether it be the Jew who has emerged from a Polish ghetto and is now working in a factory at Tel Aviv, the dominant feeling of both is an overwhelming sense of escape. The champions of Zionism have always held – and

on the whole they are now proved right – that a Jew released from an anti-Jewish environment and 'restored' to Palestine would not only feel free as he had never felt before but would also acquire a new self-confidence, a new zest in living from his consciousness that he was engaged in a great constructive task. . . . The National Home is a highly educated, highly democratic, very politically-minded, and unusually young community. . . . It is impossible, we believe, for any unprejudiced observer to see the National Home and not to wish it well."\*

Much has happened since 1937, but the impression here recorded, in its broad outlines, would require little revision, were the Royal Commission to go back to report on the Jewish National Home to-day. The anxiety to expand the existing economic structure, to improve methods of production in every field, the interest in social innovations, as well as in all cultural and artistic activity, these features are still characteristic of Palestine Jewry.

Today, as a result of the interruption of large-scale immigration owing to the war and the 1939 White Paper, the youthful structure and appearance of Palestine Jewry may be less striking, yet in 1943 there were 60 per cent. of the Jewish population in the age groups between 15 and 50 years. Only 12.4 per cent. were in the age groups above 50 and 27.1 per cent. below 15. This abundance of youth, due to immigration, is responsible for the fairly high birth rate. The Jewish birth rate fluctuates a good deal and is closely related to economic and political conditions, and also to the 'ethnic' composition of the Jewish population. Thus, in 1937, the year in which the Royal Commission published its report, Jewish births were 26.7 per one thousand and Jewish deaths 7.8 (natural increase 18.9), whereas in 1944 there were 30.2 births and 7.2 deaths per one thousand of the Jewish population (natural increase 23.0). This high fertility is not evenly distributed throughout the Jewish community, but varies with the origin and background of each particular family. The heterogeneous make-up of the Jewish community – from the highly progressive, industrialized Jew of Central Europe to the backward Oriental Jew

\* Palestine Royal Commission Report, pp 113-125, Cmd. 5179. 1937

from Southern Arabia or Kurdistan – is reflected in the size of the family. Whereas the average number of children in an *Ashkenazi* family is 1.86, in a *Sephardi* family it is 3.10, rising steeply to 5.38 in a *Yemenite* and 8.4 in a *Kurdi* family. The oriental sections of the Jewish population, more backward in their education and economically less secure, are thus, relatively, contributing a larger share of the natural increase of the National Home than the other, more numerous and prosperous, sections. The oriental communities make up about a fifth of Palestine Jewry, but their proportion is bound to rise.

The natural increase of Palestine Jewry compares favourably with that of most European countries. Should immigration cease, the Jewish population will not be able to maintain even its present position of a third of the total population.

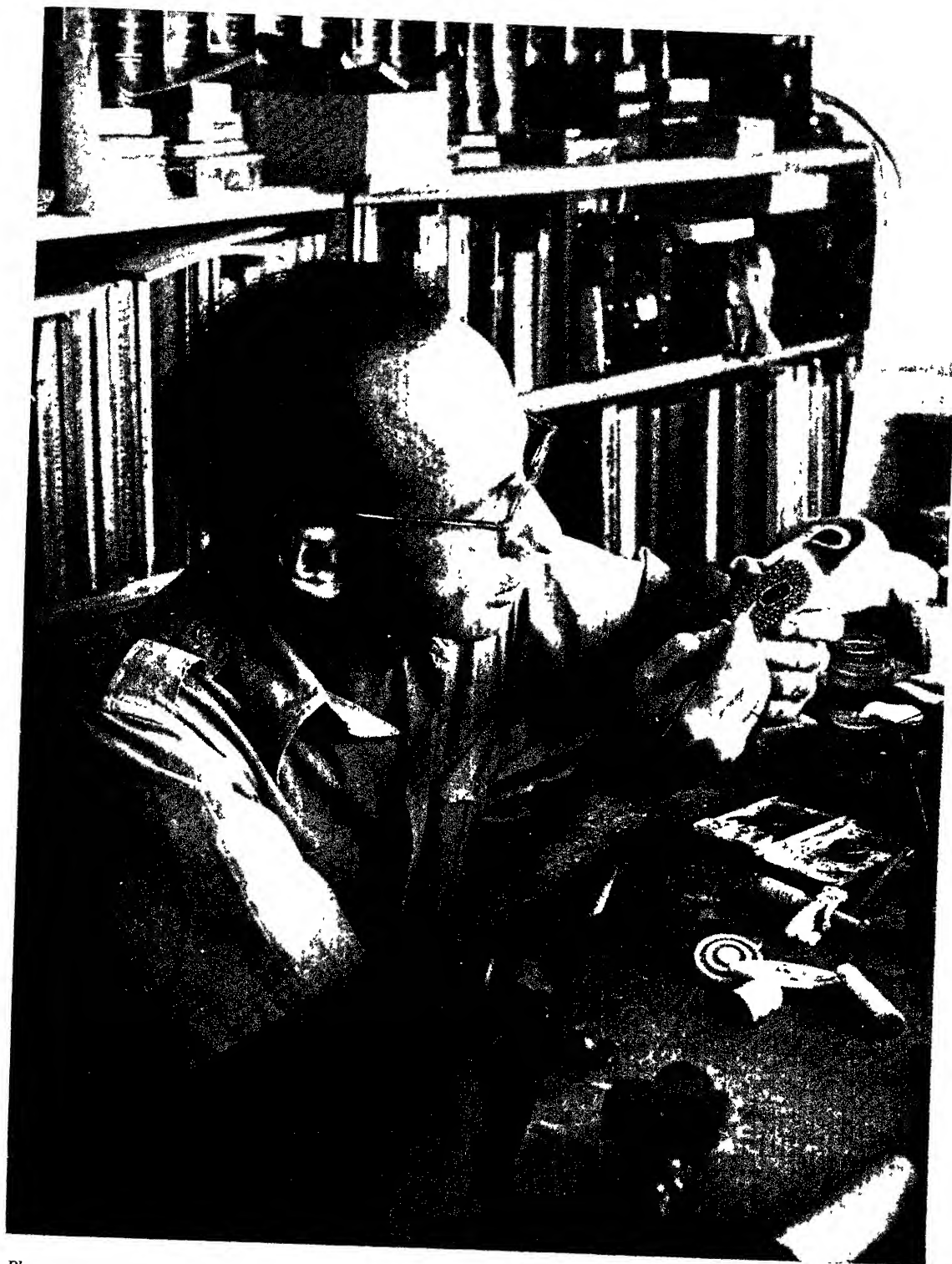
#### Internal Organization.

In a country like Palestine with its multiplicity of racial and religious backgrounds, with its wide differences as regards language, customs, standard of life and education, a uniform organization of communal life is ruled out. A measure of autonomy, in the cultural and religious sphere, for the main communities is clearly indicated. The Jews who hope to build up their numbers in order to make the country an assured home for the Jewish people and its civilization, have no wish to see the Arab national personality obliterated. Thus, whilst the future of the Arab nation seems well assured in several large Arab states, the Arabs of Palestine must be free, in the Jewish view, to develop their institutions and their way of life in their own manner. This flows logically from the basic concepts of the Jewish national movement with its respect for all nationhood. Once Palestine has, in effect, become the homeland of the Jewish people, the central government of the country would retain authority over matters of common concern like railways, posts, currency and defence, yet much scope in the religious, educational, social and judicial sphere would be left to the administrations of the various communities.

Palestine never had a separate existence except in association with the Jewish people, and the Jews, ever since their return some sixty years ago, have created a nucleus of a Jewish polity

long before their numbers really warranted it. They began to organize their own community life under the old Ottoman regime. Yet it was not until 1927 that the Jewish community was recognized as a juridical body with power of taxation for certain purposes. These taxes are imposed through local Jewish community councils, which are identical with the municipality in places where there is a Jewish majority. The organized Jewish community (*Knesseth Yisrael*) comprises all Jews in the country excepting any who declare their wish to step outside. An Elected Assembly of Palestine Jewry takes care of education, and of the social and religious welfare of the community. In the last election to the Assembly in August 1944, 200,881 persons exercised the vote, i.e., more than 70 per cent. of those entitled to vote. The National Council, through its Executive, directs the day-to-day affairs of the organised Jewish community. It works hand in hand with the Jewish Agency which is the supreme authority as regards reconstruction and amelioration, agricultural settlement and industrial planning, internal security and external representation. The Jewish Agency, internationally recognized under the Mandate, represents the Jewish people as a whole, whereas the National Council is exclusively Palestinian.

Apart from its communal and municipal organization, Jewish Palestine leads a very intensive life in a variety of political, professional, trade, cultural and scientific organizations. The part played by the General Federation of Jewish Labour in the life of the country has been indicated in relation to the social and economic sphere. It may be added that it is an equally potent factor in welding the working population into one cultural whole. There are a few smaller labour organizations, amongst which that of religious workers (*Hapoel Hamizrachi*) may be noted. It unites those who believe in a life of labour based on the teachings of religious Judaism. Another organization of note is the Jewish Manufacturers' Association with a membership of about 1,000 industrialists. Many of the Jewish citrus-growers are members of the Association of Jewish Farmers, and the artisans and merchants have organizations of their own. Such organizations usually have a special bank allied to them, although the transactions



*Photo* JEWISH AGENCY FOR PALESTINE

Refugee type: A former art historian

of members of each particular organization are by no means confined to their own bank. There are also Jewish Chambers of Commerce in the main cities.

Beyond the economic and social aspects of the growth of modern Jewish Palestine, there are its cultural problems. For however sound, economically, the balance of trades and professions may be, this in itself is not enough to create a nation.

#### Cultural Integration.

Gathered from all corners of the earth, the Jews bring their linguistic and cultural divisions with them. Yet within a fairly short space of time the worst features of a cultural Babel are overcome. Hebrew, always a living literary medium, has become an inevitable link between different branches of Jewry. It is to-day the ruling language in school, meeting-hall and theatre, and, largely also, in field and workshop. Owing to the Hebrew school system and the devoted work of teachers, the whole young generation has Hebrew for its mother-tongue, even though it is not always their mothers' tongue. It is growing up in the Hebrew tradition which has its roots in the Hebrew Bible, and which has developed in centuries of law and lore, poetry and philosophy and in the Hebrew literary renaissance of the last hundred years. Palestinian Jewry is already producing a literature covering every sphere of human activity. The Hebrew language is no longer confined to the realms of poetry or the humanities.

The victory of Hebrew over a host of various tongues and dialects is, in a sense, the consummation of the whole Palestinian endeavour. Ultimately, the success or failure of the Jews in Palestine will be judged by what they achieve in terms of creative culture. The world has known many illustrious Jews who have made noteworthy contributions to science and letters. Yet, almost since the Bible became the heritage of civilized Europe, the world has lost sight of the Jews as a specific creative entity. The Jewish Return is ultimately to make it possible for the Jew to become creative—unself-consciously crea-

tive—in his own environment and in terms of his own tradition.

#### Rebirth.

As one surveys the growth and rebirth of the Jewish nation in Palestine, it seems little short of miraculous. It has been a long struggle against indifference and hostility. And it has been a record which gave the lie to a long series of gloomy prophecies. By every standard applied by the experts, the Jewish National Home should have long succumbed to external attacks and internal difficulties. Yet, sorely tried and tested, it does not show the slightest inclination towards disintegration.

In 1930 a British Colonial Secretary said that you could not 'swing a cat' in Palestine. Since then nearly 300,000 Jews have come in, and to-day no one would dare suggest that the country could not take further immigrants. There were those who thought the Jews could not successfully adapt themselves to life on the land. Others doubted their fitness for heavy industry. And still others predicted that, gathered under pressure of persecution, this new community would fall apart once that pressure has gone.

They all counted without the stubborn devotion of the pioneers. They did not—and perhaps could not—know what wealth of unused idealism and creative energy lay stored up in masses of ordinary Jewish men and women. It has transformed Palestine from a depressed area into the most progressive land in the Middle East. Harboured some of the most constructive experiments in social relations of our age, it has given tongue to the Jews' age-long striving, rooted in the vision of the prophets, for social justice and eternal peace. A generation of Jews has sprung up, sturdy, unafraid, attached to the soil of their homeland.

T. E. Lawrence, with characteristic insight, once observed: "The problem of Zionism is the problem of the third generation. It is the grandsons of your immigrants who will make it succeed or fail." To-day we may add without hesitation: the grandsons have not failed.

## Arab Economy in Palestine

The picture of a modern Jewish economy with high standards projected on to a backward Arab economy, yet hermetically sealed and segregated from it, belongs to the past. Interaction between the two economies is constantly on the increase. The Arab economic sector is in the throes of transformation. The standard of life rises, production expands, consumption rises, and the concomitant of the transition from a subsistence to exchange economy is the rising standard of life and real income, decreasing rate of infant mortality, higher standards of hygiene and health and the spread of modern education.

The war accelerated these developments. A large Arab labour force was drawn into employment by Government and military authorities, thus increasing the strength of the wage-earning class among the Arab population. The *fellaheen*, still the backbone of Arab society, became prosperous owing to the sevenfold increase in the price of their main produce, grain, without a corresponding increase in the cost of production as far as native farming is concerned. Arab agriculture got rid of its heavy indebtedness, and the Arab urban population entered into new commercial and industrial undertakings. The large accumulation of capital in most sections of Arab economy brought about shifts and changes in the Arab social and economic structure.

The most important features of present-day Arab economy are connected with the demographic development of, and are related in one way or another to, the changes that have taken place as a result of Jewish immigration. The comparison of Moslem infant mortality in Palestine before the beginning of Jewish mass immigration with that in later periods, and the comparison of Moslem infant mortality in the various regions of Palestine classified according to the intensity of Jewish settlement in those regions, provide a good index of the effect of Jewish colonisation upon the Arab population. Changes in Moslem infant mortality in various zones and the degree to which they were concomitant with Jewish penetration into these

zones lend weight to the conclusion that the repercussions of Jewish colonisation resulted in a considerable improvement in the health and hygiene of the Arab population.

This improvement has been reflected in a rapid decrease of mortality – particularly infant mortality – and has reduced the Arab death-rate to a relatively low level. It appears that the Moslem population of Palestine is passing through a transition period – the period which lies between a high birth-rate and a high death-rate (the characteristics of backward peoples) and a low birth-rate and a low death-rate (the characteristics of advanced peoples). The following figures illustrate this trend:

### Total Population Movements. Moslems Only\*

	Death Rate	Birth Rate
Average 1925/27	28.6	52.6
Average 1927/39	20.3	47.8
Decrease	– 29%	– 9%

In Palestine the death-rate has fallen rapidly, but the birth-rate has remained high, the reason being that the rapid development of the country and the integration of the colonization economy with the indigenous economy caused a general rise in the standard of life. This rise is reflected in the decline in death-rates, particularly of infants, while the birth-rate did not follow suit at the same pace. In countries in which the process is gradual the decline in the death-rate, owing to general improvements, is, as a rule, accompanied by simultaneous changes, mental, psychological and cultural, leading to declining birth-rates. It is obvious, however, that if the process of material improvement is very rapid and revolutionary, psychological and cultural changes of environment cannot keep pace with this rapid improvement and the decline in the birth-rate lags behind the decline in the death-rate, the result being an extraordinarily rapid increase of population.

\*Calculated from Statistical Abstract of Palestine, 1942, p. 13. Tables XV and XVI.

The increase of the Moslem population in Palestine would seem to provide evidence that the expansionist tendencies of Palestine's economy lead to a rise in the standard of life of Arabs following an increase of production and access of capital.

#### Agriculture.

Some two-thirds of the Arab population of Palestine derive their livelihood from agriculture. The condition of agriculture in Palestine prior to the commencement of Jewish colonisation is well known from contemporary reports. The Report of the High Commissioner on the Administration of Palestine, 1920-25 says :

"Although nearly two-thirds of the population of Palestine are engaged in agriculture and allied occupations, the country districts are thinly peopled and for the most part poorly cultivated. . . By far the greater part of the cultivable area remains in the hands of the Arabs. Each year a considerable portion of this is left untilled. The methods of cultivation employed are usually primitive. Until recently land was rarely manured, when one patch was exhausted another was ploughed. Many villages had suffered severely by the felling of olive trees for fuel and by the loss of their ploughing animals during the war. The few forests that had survived till then were almost all cut down during those years. The characteristic that, to the European eye, most distinguished the typical Palestine scene is its absolute bareness of trees."<sup>1</sup>

The Arab peasant, as competent Arab opinion admits, lived in wretched poverty :

"Yet the *fellah* in Palestine has always been, until recently the subject of oppression, neglect, and ill-treatment by his own countrymen and the old political regime. The feudal system played havoc in his life, and the effendi class looked down upon him, and the old Turkish regime was too corrupt to be concerned with such a vital problem."<sup>2</sup>

Indebtedness has always been the most important factor, overshadowing all others, in Eastern agriculture. The situation is strikingly

described in the Memorandum<sup>3</sup> prepared by the Government of Palestine for the Royal Commission in Palestine :

"It has long been recognized that indebtedness is no new thing in Palestine. It is generally alleged that the Palestinian *fellah* is born in debt, lives in debt and dies in debt. It is also contended that for many generations, and indeed centuries, his life has been made miserable by the pressure of his creditors and that his moral and material progress has been severely handicapped by the burden of his debts and the cruel rate of interest paid by him."

As to the rate of interest at which this credit is extended the same Memorandum<sup>2</sup> states :

"A rate of 30 per cent. per annum is perhaps the commonest, but 50 per cent. for three months is not unusual. The result is that many farmers now owe sums that are quite beyond their capacity to pay."

Mr. C. F. Strickland, of the Indian Civil Service, who was called upon to study the problem in 1930, said :

"The amount of (the *fellah's*) debt is not only burdensome and such as to hamper any attempt at progressive agriculture, but no small percentage of the cultivators are entirely insolvent and neither co-operative credit nor any form of State loans can place them in a solvent footing if the whole nominal claim of their creditors is to be paid."

In the years between the two wars, which saw a world-wide depression, accompanied by a catastrophic slump in agricultural prices, the Palestine Government introduced some important economic measures in order to help cultivators. First, a sliding-scale protective tariff was introduced for wheat, the staple product of the *fellah*, providing for a fixed and reasonable price of wheat for the local cultivator. The local agriculture would not have been able otherwise to compete with highly mechanized modern farming as practised in Australia, Canada, the U.S.A., etc. The second measure was connected with taxation, the burden of which upon the rural community,

<sup>1</sup> Report of the High Commissioner on the Administration of Palestine during 1920-25, London, 1925, p. 16.

<sup>2</sup> Afif J. Tannus in "The Open Court," 1935/36.

<sup>3</sup> Memorandum to the Royal Commission, pp. 41, 42, 43.



*Photo Z. KLUGER*

Arab wedding costumes: The bride's father



predominantly Arab, was very heavy under the Ottoman rule.

During the inter-war period revenue was rapidly growing, whereas the taxation burden of large sections of the population has been decreasing. The financial position enabled the Government to remit, year after year, a large proportion of tithe payments – the tithe being the principal agricultural tax in Palestine – which formerly fell with particular severity upon the poorer sections of the Arab population. As a result of this liberal policy, tithe collections fell from LP286,521 in 1921-22<sup>1</sup> to LP109,000 in 1934-35<sup>2</sup> in spite of the growth of the population during these years. In the two years 1933-35, as much as LP345,000 of tithe dues were remitted. While in 1922 the tithe constituted 12.4 per cent. of revenue, in 1934-35 it constituted only 2 per cent.

These tax remissions, the importance of which for a peasant population can scarcely be over-estimated, have redounded mainly to the benefit of the Arabs, since they constitute the majority of the rural population (86 per cent). The new methods of raising revenue were made possible by the great increase of urban population which alleviated the burden shouldered formerly by the rural population.

However, these developments alone could not radically change the lot of the Arab *fellah*. The following two quotations on the situation in Syria and Iraq may serve equally well to illustrate the problem of the Palestine *fellaheen*: The agrarian problems, the low standard of life, low wages and lack of capital are their main problems. The situation is very strikingly described by Mr. Delbes, the Director of the Agricultural Experiment Station in Lataquie, Syria<sup>3</sup>:

“Among the reasons for the *fellah*’s backwardness social factors play a role similar to, and it may even be said, greater in importance than technical conditions. While indeed it may be possible in a comparatively short time to spread knowledge of modern agricultural methods, it is far more difficult to change the social conditions of the tiller of the

ground and the land ownership regime under which he lives. One of the main present obstacles to agricultural advance is to be found in the existing system of land tenure. . . . The owners of large landed property – families or groups of families – take little if any interest in the agricultural development of their lands. . . . The *fellaheen* who work these lands live in a state comparable to that of the serfs under the Carolingian dynasty. Hardly 20 per cent. of the gross produce of the soil remains to its cultivator. . . . It may almost be said that landlords here are engaged not, in exploiting the land, but those who cultivate it. . . . As under the existing system of taxation no charge is levied on uncultivated lands, landlords are able without loss to themselves to leave large areas unused.”

Mr. Hashin Jawad, an Iraqi economist attached for some time to the I.L.O., in his booklet *The Social Structure of Iraq*, endorses this view of the roots of the agrarian problem. He estimates the income of a *fellah*’s farm from which five to six persons derive their living at LP10 to LP12 (at pre-war prices) or LP15 to LP20 according to zone. The reason for this, according to Mr. Jawad is “to be found in the prevailing system of land tenure, by which the final remuneration reaching the farmer keeps him continuously on the borderlines of starvation.” “The system of relationships between the ‘big man’ who is either a landlord living in the city or a roving Sheikh, and ‘the small man,’ who is the actual cultivator of the land and whose life is totally devoted to it, is at the base of the whole social structure of Iraq, which has, in fact, many of the characteristics of the Feudal System.” “The Feudal System, in other words, is more than just a system of economic relationship; it is also the framework on which the social, cultural, political and even religious institutions are built. This system, generally speaking, determines the status of each man in the society; it gives him his income, reflects on his state of health and even determines his expectation of life.” As a result “the average expectation of life does not exceed 26 or 27 years” in Iraq.

The problem of Arab agriculture in Palestine is mainly one of indebtedness and land tenure.

<sup>1</sup> Granovsky, A : *Das Steuerwesen Palaestinas*, Jerusalem, 1933

<sup>2</sup> Report by the Treasurer on the Financial Transactions of the Palestine Government for the year 1934/35, p. 5.

<sup>3</sup> Bulletin de l’Union Economique de Syrie, Paris, 1928.



The debt burden is now greatly reduced thanks to the prosperity and to exorbitant prices of grain during the war. Feudal exploitation is in Palestine less burdensome owing to the existence of a large labour market with comparatively high wages.

The technical problem of Arab farming is mainly one of irrigation and change-over from production of energy producing foodstuffs to production of protective foodstuffs. It is instructive to compare the comparative productive capacity of irrigated and unirrigated land.

Income and Cost Account  
of Irrigated and Unirrigated Fellah Farm (in LP)

	Unirrigated farm 100 dunams	Irrigated farm 20 dunams
Income from Sale of Surplus	15,300	82,460
Income from outside work	12,000	—
Farm Produce retained for own consumption	18,850	27,200
Gross Income	46,150	109,660
Operating Expenditure	16,800	30,200
Net Income	29,350	79,460

Thus, the key of conversion of irrigated to non-irrigated areas would appear to be 1.5. But this calculation includes, as may be seen from a comparison of the net results, an allowance for an improvement by 171 per cent. of the cultivator's standard of living in favour of the irrigated farm.

Some small shift to more intensive production of protective foodstuffs took place in the inter-war period.

In the hill districts, which had formerly been pronounced uncultivable, fruit trees were planted by the *fellaheen*; they now constitute a considerable part of the hillside economy. The area under fruit plantations in the Arab villages of the hill region increased, according to Government figures from 332,000 dunams in 1931 to 832,000 dunams at the end of 1942. Another striking indication is the increase of livestock in the Arab farming sector. According to the Government Census of 1943, cattle

in Arab ownership numbered 214,570 head. The corresponding figure for 1930 was 134,000, the increase in these 13 years being 60 per cent. Simultaneously, the number of poultry in the Arab sector rose from approximately 900,000 to 1,460,000, i.e. by 62 per cent.

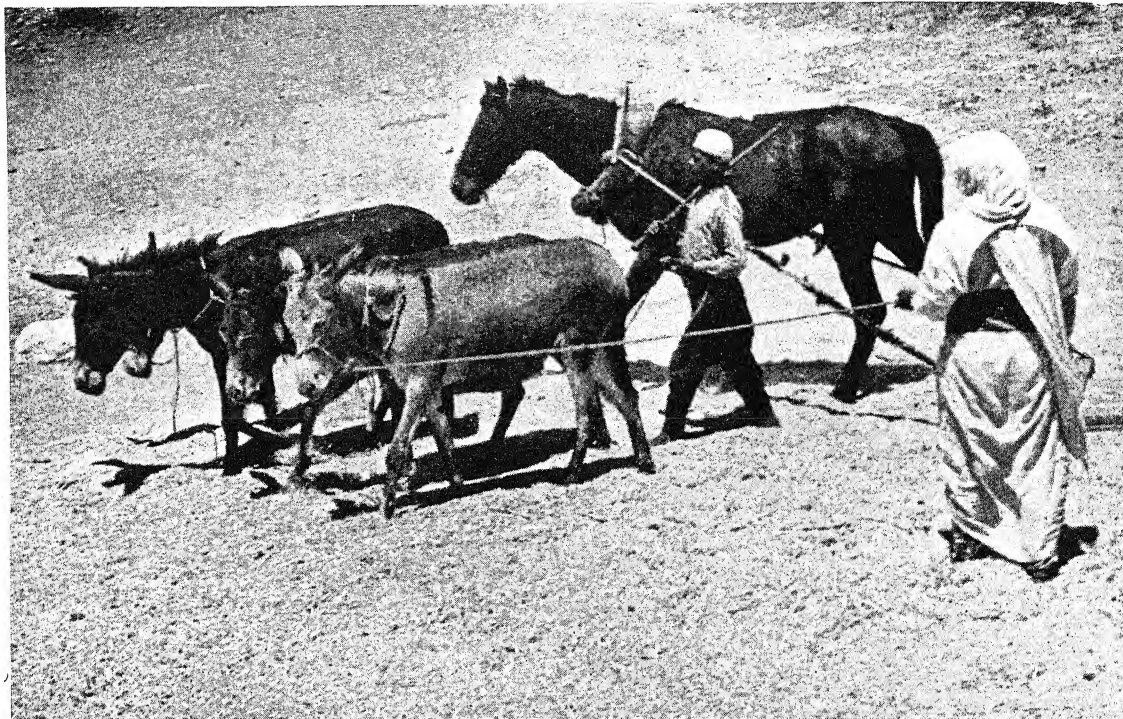
The most outstanding feature of Palestine's agricultural development before the war was the ever growing citrus industry. After a few years of experiments and concentrated effort, Palestine became the second largest citrus exporting country in the world, the Arab sector developing almost to the same extent as the Jewish sector.

*Development of Citrus Plantations (in dunams)*

End of Year	Jews	Non-Jews	Total
1922	10,000	22,000	32,000
1927	24,000	33,000	57,000
1930	60,000	47,000	107,000
1933	120,000	81,000	201,000
1935	153,000	134,000	287,000
1937	155,500	144,000	299,500

Citrus exports — the backbone of Palestine's export trade increased from 931,000 cases in the 1920/21 season to 15,310,000 cases in 1938/39, the increase in value being from LP206,000 in 1921 to LP3,808,000 in 1939. About 45 per cent. of this export came from Arab groves.

The increase of Arab agricultural production per capita up to the war seems to be considerable. It is much more pronounced if citrus is included in the total estimates as the citrus area increased about sevenfold. In mixed farming, where cereals which cannot be rapidly expanded play a very considerable part, the rise must naturally be much less pronounced. The per capita increase must be seen against the background of an extraordinarily rapid increase of the indigenous population, so that simultaneously with the rise in the standard of living additional sources of livelihood had to be found for the increment of the population. Nevertheless, even in mixed farming some increase is noticeable, due in the main to expanding marketing possibilities through the increase of the urban population and the accumulation of capital,



Arab harvester as in Bible times

Photo Z. KLUGER

resulting from land sales and decrease of agricultural taxation. The development of cereal and vegetable production of the country as a whole is indicative of these changes :

*The Development of Cereal and Vegetable Growing*

	Cereals M. Tons	Vegetable M. Tons
1930	184,468	12,865
1931	137,712	16,068
1932	90,825	24,371
1933	87,233	21,305
1934	193,992	36,465
1935	219,393	67,847
1936	153,350	70,321
1937	263,860	120,395
1938	174,424	109,088

This trend of stationary cereal crops and increasing vegetable production is intimately connected with the expansion of urban markets and is particularly marked in districts adjacent to such markets.

The war has accelerated the process of modernisation of farming, but the retarding influence of habit and certain mental attitudes is still strong. It takes a long time to transform a primitive and self-sufficient agriculture of a predominantly feudal character into more intensive agriculture with scientific production methods. Apart from the capital required for the improvement of production methods and for the change-over to more valuable crops and animal products, a change in the human attitude and in the social conditions must also take place.

*Industrialisation.*

The present Arab economy is mainly based on agriculture. However, the physiocratic conception that a fixed proportion of the Arab population must be bound to the land and that this is its only possible economic basis is contradicted by modern economic development. The whole fate of agriculture depends on marketing facilities and the growth of urban

population. Arab farming cannot be intensified and thus made more profitable without a shift from energy producing (cereals) to protective food-stuffs (eggs, dairy products, etc.), i.e. from extensive to intensive agriculture, and this is entirely dependent on the size of the urban population.

However, the accretion of capital equipment is subjecting the economic structure of Palestine to a dual change. It superimposes on the old economy an industrialized system of production, increases the share of secondary and tertiary income, owing to a greater division of labour, and

% Occupational Distribution of Population (Farmers)

Country	Year	Agricultural	Const. Ind. Ming:	Transport	Commerce	Admin.	Lib. Prof.	Dom. Service	Misc.
Canada <sup>1</sup>	1931	31.1	18.8	6.1	16.7	0.7	6.3	8.1	11.3
U.S.A. <sup>2</sup>	1930	22.0	30.9	7.9	21.4	1.5	6.7	9.4	0.3
Germany	1933	28.9	40.4	4.8	13.6		8.4	3.9	—
Italy ..	1931	47.3	29.5	4.6	8.3	2.1	3.3	3.9	1.0
Netherlands	1930	20.6	38.1	7.6	15.8	1.5	6.7	8.3	1.4
United Kingdom	1931	6.4	36.8	8.7	20.6	0.6	4.6	11.6	9.8
Belgium	1920	19.3	46.8		18.3		6.9	4.5	4.2
Poland	1921	76.2	9.5		5.7		2.5	1.7	4.4
Australia	1921	22.7	35.1		27.9		8.7	5.1	0.5
New Zealand	1926	24.2	26.4		28.4		10.0	5.1	5.9
India	1931	66.5	10.2	1.5	5.1	0.6	1.5	7.1	7.5
Palestine (Jews) <sup>3</sup>	1931	19.1	30.6	5.1	13.8	2.0	11.6	5.3	12.5
Palestine (non-Jews) <sup>3</sup>	1931	59.0	12.9	6.0	8.4	1.3	2.3	3.2	6.9

Thus, occupational redistribution is one of the most urgent problems of Arab economy.

The above table reflects the occupational distribution of the population of various countries in comparison with both Jews and Arabs in Palestine:

It is interesting to note that the highest proportion of agricultural population is to be found in countries with the lowest standard of life, such as India, Poland, Italy, while progressive, although mainly agricultural economies, such as Australia and New Zealand, have a comparatively low proportion of agricultural population. Of course, the explanation of this process is the higher productivity of agricultural labour and a transition to more modern methods of cultivation. Palestine itself provides an example of the two types of economy in the different occupational structures of the Jewish and the Arab population.

<sup>1</sup> Statistical Yearbook of the League of Nations, 1934/5, Table 4.

<sup>2</sup> Statistisches Jahrbuch fuer das Deutsche Reich, 1932, App., p. 25

<sup>3</sup> Census of Palestine, 1931

creates new employment facilities, which in their turn call forth the required labour force

The new population strata resulting from the accretion of capital cannot be accounted for by an estimate of land. They are the outcome of structural and socio-economic changes which react on the whole economy transforming it from a subsistence to an exchange economy. Such a process is accompanied by a rising standard of life. A similar process is taking place in modern India. The following is a quotation from *Great Britain and the East*<sup>1</sup> which illustrates these trends. They must obviously be considered as a positive, progressive and inevitable development, unless the retrogressive forms and methods of production, and the reduction of the standard of life of broad sections of the population are artificially bolstered up and continued:

"It is not true that India is becoming increasingly and excessively dependent upon agriculture; and since this is not the case, the fear lest such dependence should gradually

<sup>1</sup> Great Britain and the East, 1940, p. 141

lower the standard of living, is ill founded. As what we have called the 'intermediate' sphere between agriculture and industry continues further to develop, there will be an increased scope, not only for almost all the existing occupations, but also for new channels connected especially with distributional and other services. These will continue to absorb, as they are absorbing to-day, a larger proportion of the growing population."

Egypt provides the most striking instance of this process which has wrought great changes in that country's economic life. During the last two decades a very marked drift to the town and a steady process of emigration from village to town which was so characteristic of capitalism in all European countries can to-day be observed in Egypt. The Census of 1927 shows that while the total population has increased by about 11 per cent. since 1917, in Alexandria the increase has been 34 per cent. and in Cairo 28 per cent.

Thus, a certain degree of urbanization seems to be inevitable with the development of modern forms of economy. The problem is one of the expansion of productive facilities with a view to absorbing the new strata of population. Industry is one of the most important outlets for internal development.

It is extremely difficult to gauge the growth of Arab industry, as the only census of industry before 1939, was taken in 1928 and some principles and methods of classification were then different from those adopted in the 1939 census. Thus an exact comparison seems to be impossible. However, the 1928 Government census enumerated 2,395 Arab industrial and artisan enterprises of which 1,373, i.e. more than half, had been founded in the ten years since the First World War. The capital invested in this post-war industry was LP613,000 against LP543,000 in 1,022 enterprises established before the First World War. The growth of Arab population engaged in industry is to be gauged from the population census of 1931 and data on industrial and artisan employees contained in the Survey of National Income of Palestine, 1943 (prepared by the Statistical Department of the Government.)

#### Non-Jewish Earners in Industry

	1931	1939	1942 <sup>1</sup>
Occupied in manufacturing industries and mining	15,800	18,300	21,000

Thus, during a period of eleven years a considerable degree of industrial development took place in the Arab community. Moreover, while formerly the bulk of establishments consisted of artisan one-man shops and family enterprises, now wage workers are being employed to an increasing extent. The capital invested in Arab industry in 1942 was two million pounds. The pattern of this industry is indicated in the following table:

#### Non-Jewish Industry in Palestine (1942).

(incomplete) (Concessions excluded)

Industrial Section	No. of Establish- ments	Persons engaged
Food	267	1,708
Beverages	16	133
Tobacco	5	842
Vegetable oils and fats	33	170
Chemicals (excluding matches*)	30	191
Wood	286	669
Paper and cardboard	6	210
Leather	45	213
Textiles	234	1,766
Wearing apparel	345	1,330
Non-metallic minerals	59	269
Metals (incl. machinery and tools)	221	1,137
Miscellaneous	11	166
Total	1,558	8,804

The above table covers only industrial personnel employed in industry proper, as will be seen from the comparison with estimates of occupational distribution extending to crafts in the Survey of National Income of Palestine, <sup>1</sup> Figures for 1931 according to Population Census, for 1939 and 1942, C. E. Wood, Survey of National Income of Palestine, 1943.

\* Shown under Miscellaneous.

1943, prepared by the Government Statistical Department.

The expansion of Arab industry has taken place concurrently with Jewish immigration and the growth of Jewish enterprises. It was, moreover, directly correlated to Jewish industrial development.

#### Construction.

The powerful impetus received by the building activity all over the country, originating from Jewish immigration, was by no means confined to the Jewish sector. Yet the greater part

from 1921 to 1935, of which about LP21 millions have been invested by Jews.

The share of Arab labourers employed directly in Jewish building is small compared with the army of workers engaged in quarrying, metal-ling, transport, gravel and limestone work. These activities which are closely connected with building are to a great extent in Arab hands.

The share of the building trades in total Arab employment increased considerably.

The average wage rate of Arab building workers increased from 1931-1934 by 14.4 per cent., and the wage rate for Arab tile makers rose

	Building Investments in LP1,000				Population in 1,000		
	1924	Average 1930/32	Average 1933/35	Average 1936/38	1922	1931	1939
5 mixed towns	410	2,208	3,884	2,509	137	211	336
5 Jewish towns	408 <sup>1</sup>	398 <sup>2</sup>	2,949	1,268	21	59	166
16 Arab towns	57	162	172	120	111	128	151

of all building activity has been concentrated in Jewish or mixed Jewish-Arab districts. The above table computed from Government figures on annual building investments and population<sup>1</sup> gives a comparison of trends of development in the three types of municipalities for which comparable figures covering a larger period are available :

- (1) Five mixed towns : Jerusalem, Jaffa, Haifa, Tiberias, Safed.
- (2) Five purely Jewish towns or local councils : Tel Aviv, Petah Tikvah, Rehovoth, Rishon-le-Zion, Ramat Gan.
- (3) Sixteen purely Arab towns : Ramallah, Ramleh, Lydda, Bethlehem, Beit Jala, Beersheba, Hebron, Gaza, Majdal, Khan Yunis, Nazareth, Nablus, Acre, Tulkarm, Jenin, Beisan.

Building is one of Palestine's most flourishing industries. It is calculated on the basis of official statistics that nearly 36½ million pounds have been invested in Palestine building

<sup>1</sup> Published in Statistical Abstract and Annual Bulletin of Vital Statistics.

from 180-220 mils per day in 1931 to 240-400 mils in 1935.

#### Non-Jews Employed in Building Trades.

	1931	1939	In-crease
Building and Public Works	8,000	14,000	75%
Quarries, etc.	2,000	3,000	65%
Total	10,000	17,000	73%
Compared with total Non-Jewish Population	722,000	915,000	23%

#### Labour.

Labour conditions should reflect fairly accurately the effect of immigration on the economic conditions of the country. An influx of labour in excess of the expansion of the resources and

<sup>1</sup> Tel Aviv only

<sup>2</sup> Thereof 90 per cent. Tel Aviv.

productive capacity of the country would necessarily lead to competition of incoming labour with the existing labour force and bring about a decline in wages. It has been suggested that the reaction of the resources and economic facilities of a country to the influx of new immigrants should be measured by real wages indices.

Such a complete test is impossible as the compilation of statistics of real wages started in Palestine only in 1937, but an attempt of that kind for the subsequent period, supplemented by calculations for the preceding period (based on official data on nominal wages and c.o.l.) would provide some, though incomplete, indication. The following data provide such an illustration, which however, must be accepted with due reserve, considering the very short period for which data are available:

Both Jewish and Arab labour wages increased with immigration and decreased with its decline. The peak of real wages was reached in the years 1934-1935—the high tide of immigration—and the trough in 1936/39—the ebb of immigration. It would appear that the expansion of productive facilities resulting from the influx of immigration and capital created employment facilities in excess of immigrant labour.

As far as Arab real wages are concerned the decline during 1936/39—the years of reduced immigration—was aggravated by the process of economic segregation resulting from political disturbances in that period. Real wages in the Arab economy rise *pari passu* with its assimilation to modern standards introduced by the Jews and the transition of the Arab sector from a subsistence to an exchange economy. This

#### Immigration and Wages in Manufacture and Construction

Year	Nominal Wages		Cost of Living		Real Wages		Jewish net Immigration
	Jews	Arabs	Jews	Arabs	Jews	Arabs	
1931	100.0	100.0	100.0	100.0	100	100	100
1932	99.6	95.0	102.4	102.4	94	90	289
1933	110.5	97.3	99.3	99.3	111	98	901
1934	135.0	112.4	99.8	99.8	135	113	1,249
1935	131.1	110.3	99.1	99.1	132	111	1,751
1936	162.2	104.0	104.0	104.0	121	100	675
1937	120.1	100.7	109.6	109.6	110	91	146
1938	119.1	94.0	107.3	100.6	111	93	235
1939	113.3	78.6	109.1	102.7	104	77	801

Separate indices are given for Jewish and Arab labour in view of the very marked difference in the economic structure and conditions of the two sections of the economy. Labour conditions vary according to the different standard of life and productivity of these two sectors.

Fluctuations in real wages show a correlation with the flow of immigration. Immigration did not lead to a decline of real wages by competition of incoming labour in the existing labour market. The curves of real wages in both sectors run parallel to the immigration curve.

process was interrupted by the riots in 1936/39, and resulted in the Arab sector relapsing into a more primitive and self-sufficient pre-capitalist economy. The effect of immigration, as a factor making for higher real wages was temporarily defeated by segregation. The rise of real income in the Arab sector of the economy is dependent on the degree of its integration with the new colonization sector, the expansion of the market for both goods and services being instrumental in raising the general level of income.



Photo KLUGER

Arab wedding costumes: The decorations worn as veil over noses and mouths

The real gains of the Arab population in this field are not expressed by the development of wages alone, but also by a certain shift in the occupational structure.

The number of Arabs employed in Government services or public works rose from less than 8,000 in 1931 to over 18,000 in 1938, i.e. by 125 per cent. As the non-Government urban economy has developed at least proportionally to the increase of population, it is to be assumed that the additional Government servants and workers have been recruited from the villages, the man-power of which was then even less rationally utilized than to-day. No less than

10,000 Arab earners have therefore been transferred from agriculture where the annual income per earner was in 1936 only LP27 per year, to Government employment with an average annual pay of LP120 per salaried employee and LP60 per daily worker.

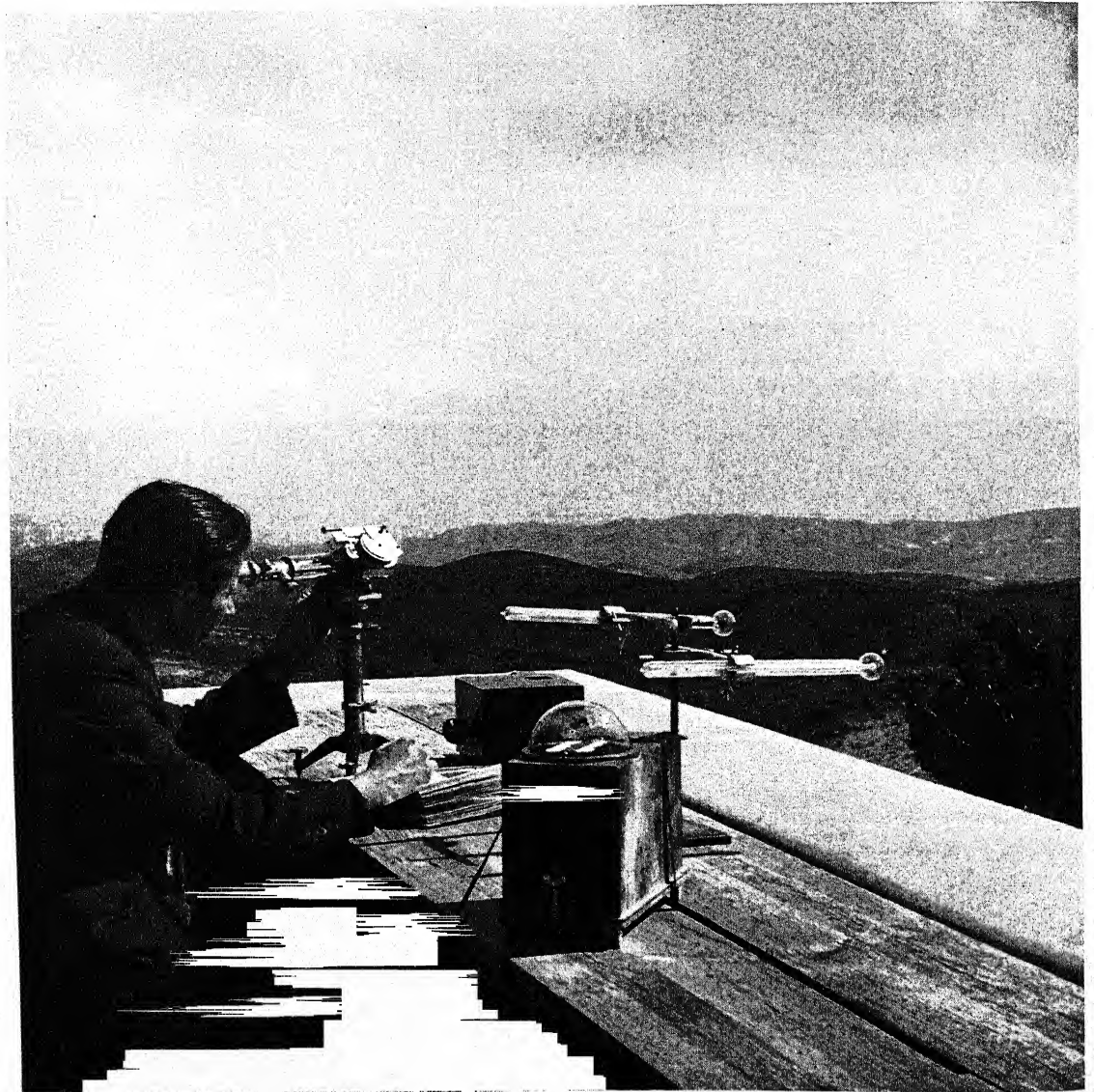
The Arab influx into the country consists to a great part of cheap unskilled labour from Transjordan and Syria and inasmuch as the standard of living and requirements of these people are much lower than those of the Palestinian Arabs, they may constitute, as they have in the past, a serious threat to local Arab labour.



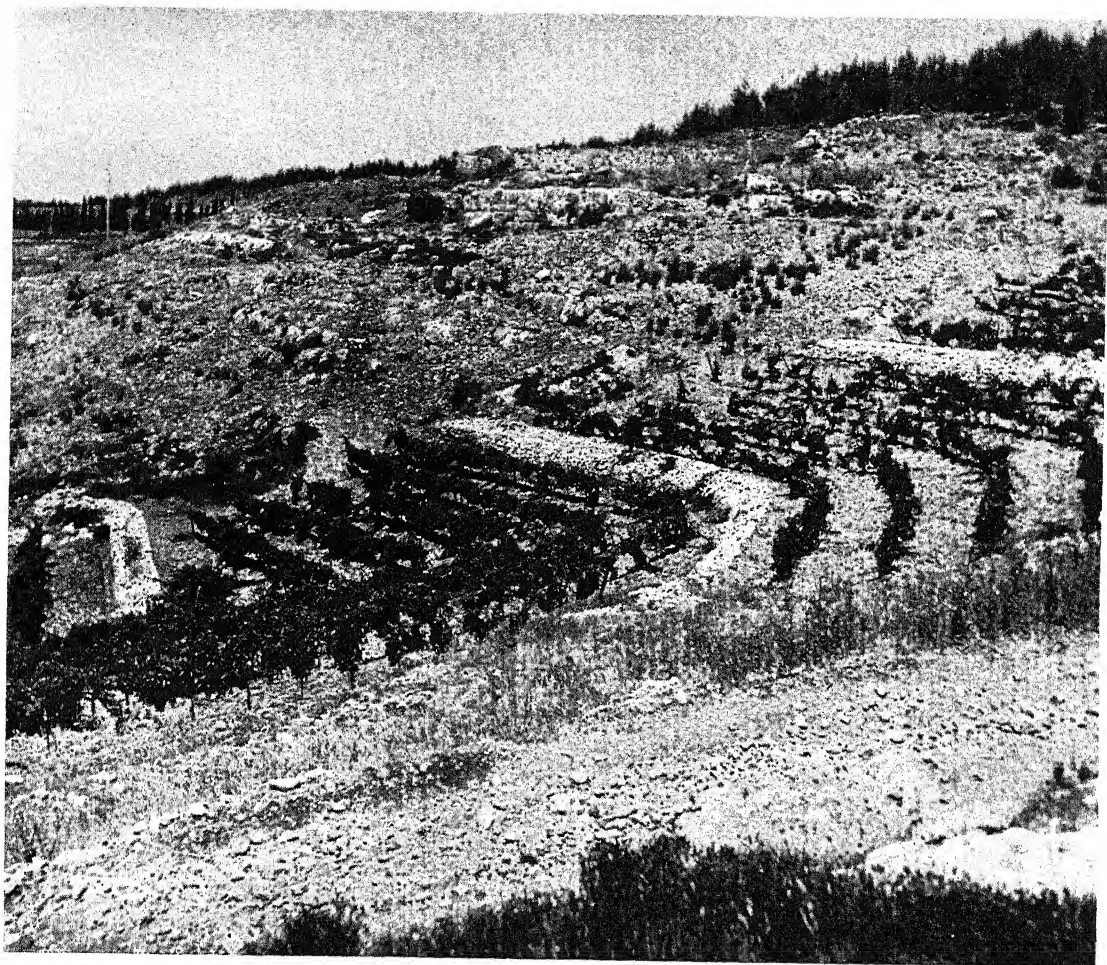
## A Promise to the Middle East

View from the Meteorological Institute (Jerusalem)

*Photo* BERNHEIM

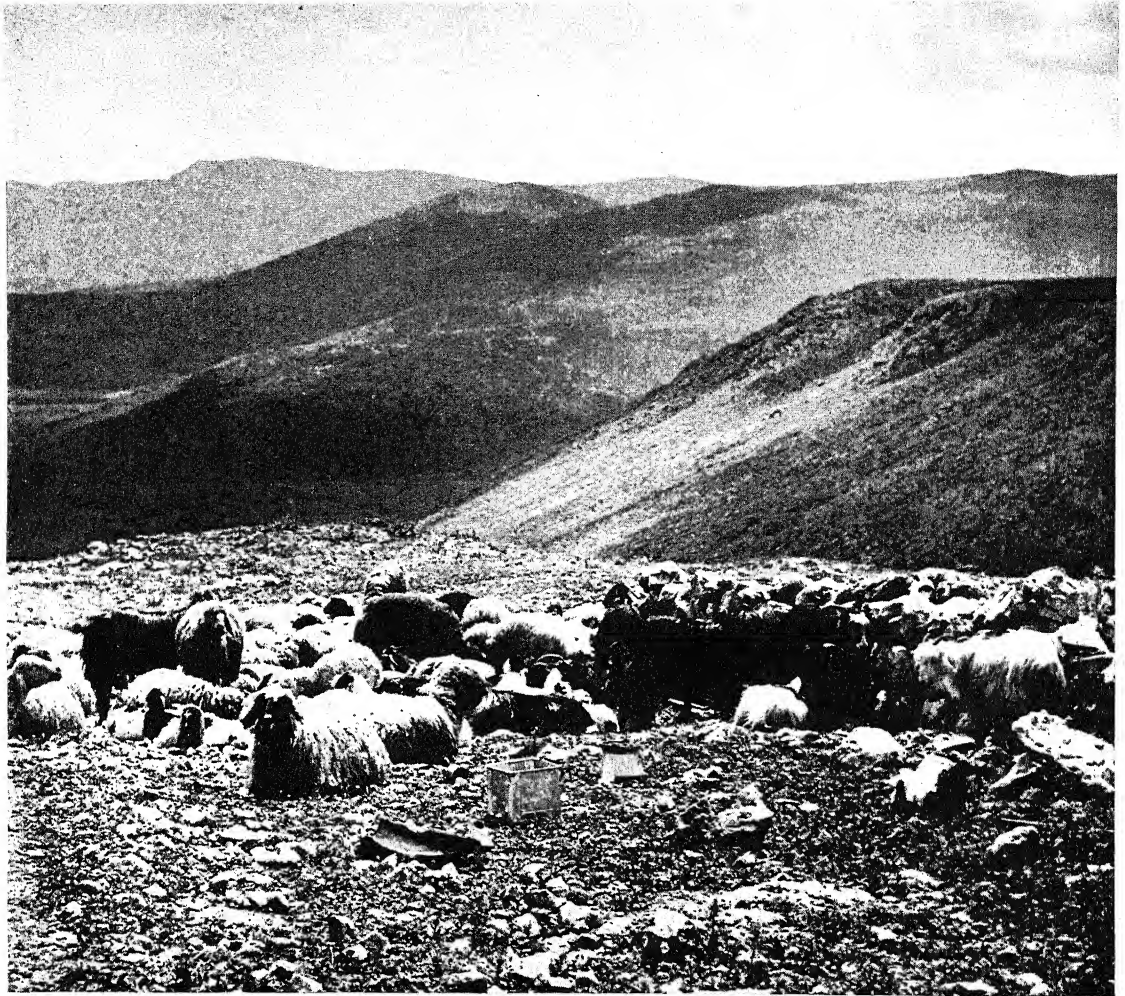






*Photo* KLUGER

Citrus terraces (Maale Hachamisha)



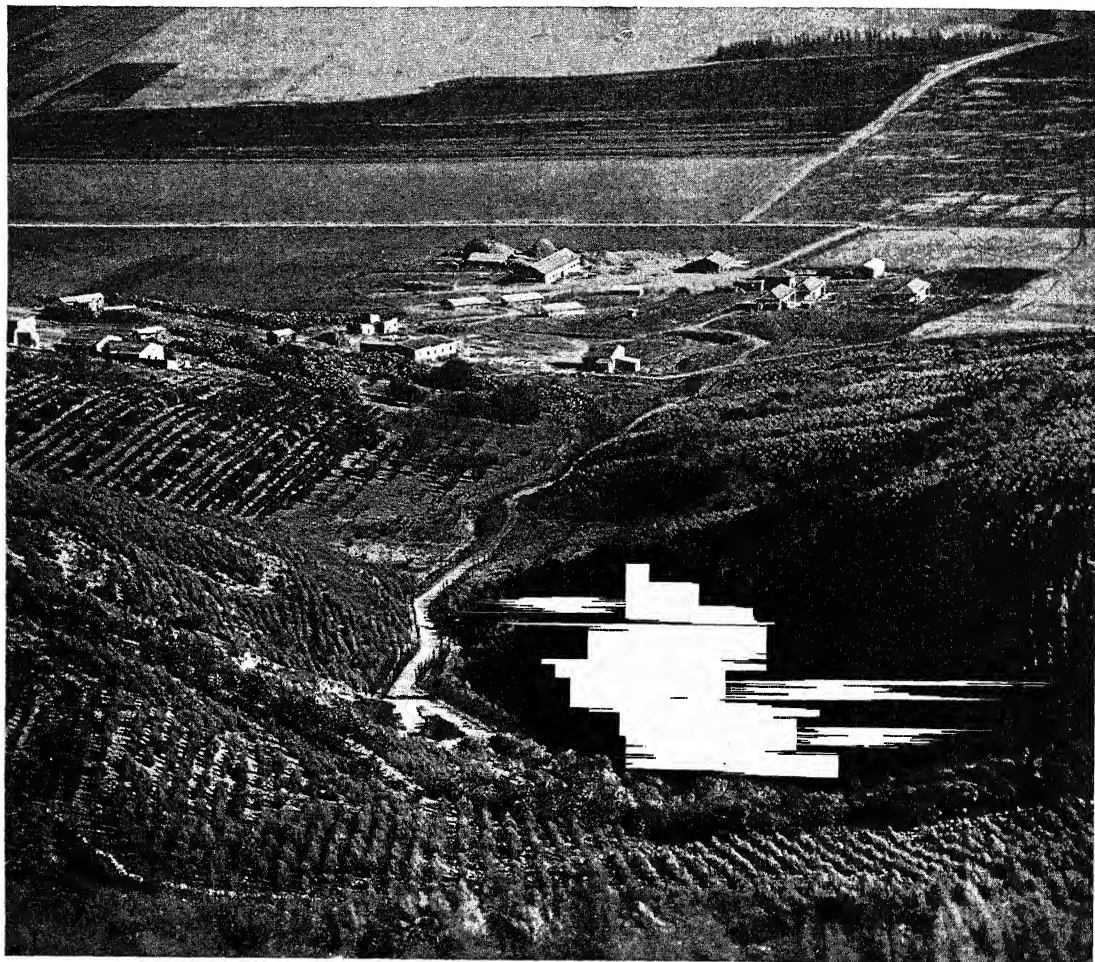
Landscape near Safed

*Photo KLUGER*



Photo KEREN KAYEMETH

Land settlement (Mishmar Haemek)



Balfour Forest, 1930

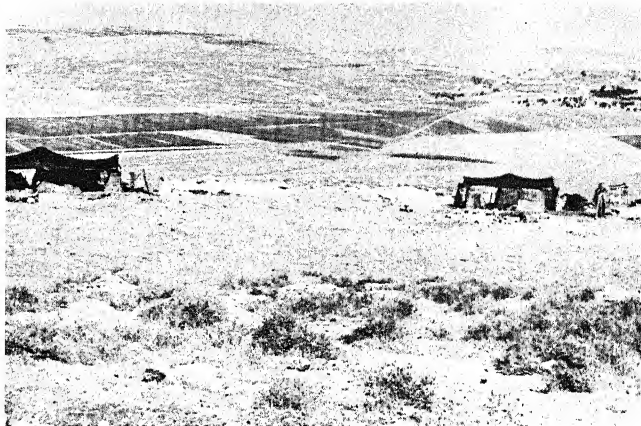
*Photo KEREN KAYEMETH*



## The Social Fabric

### Making a Settlement Ramat Naphtali

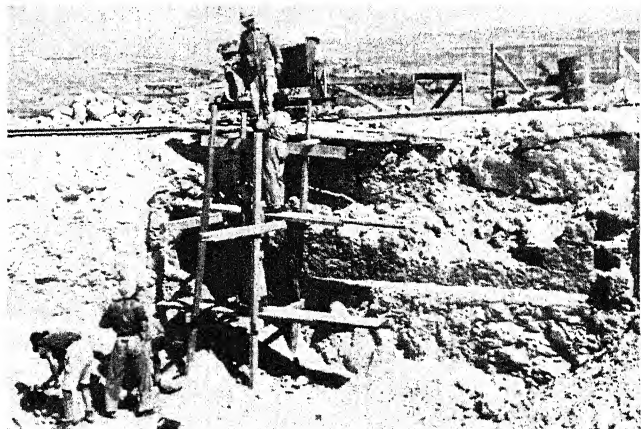
(a) First wooden shacks



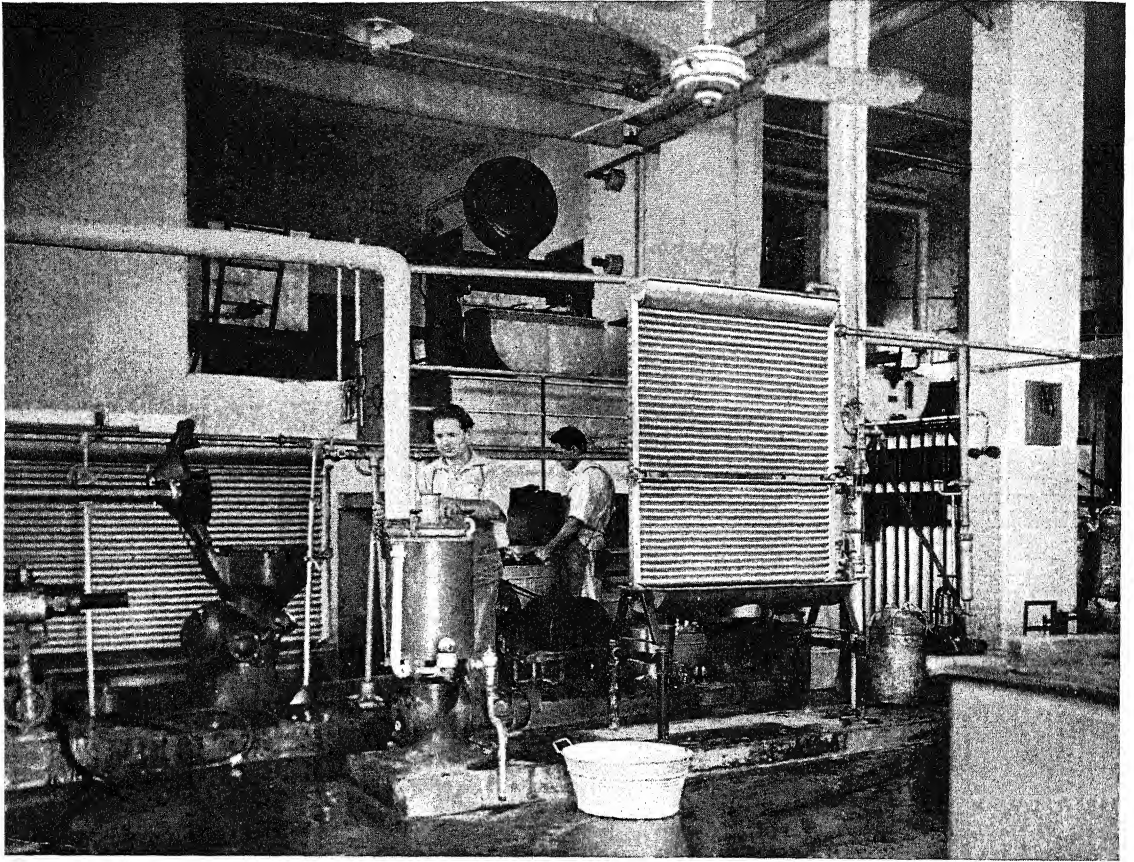
(b) The site



(c) Reservoir construction



*Photo JEWISH AGENCY FOR PALESTINE*



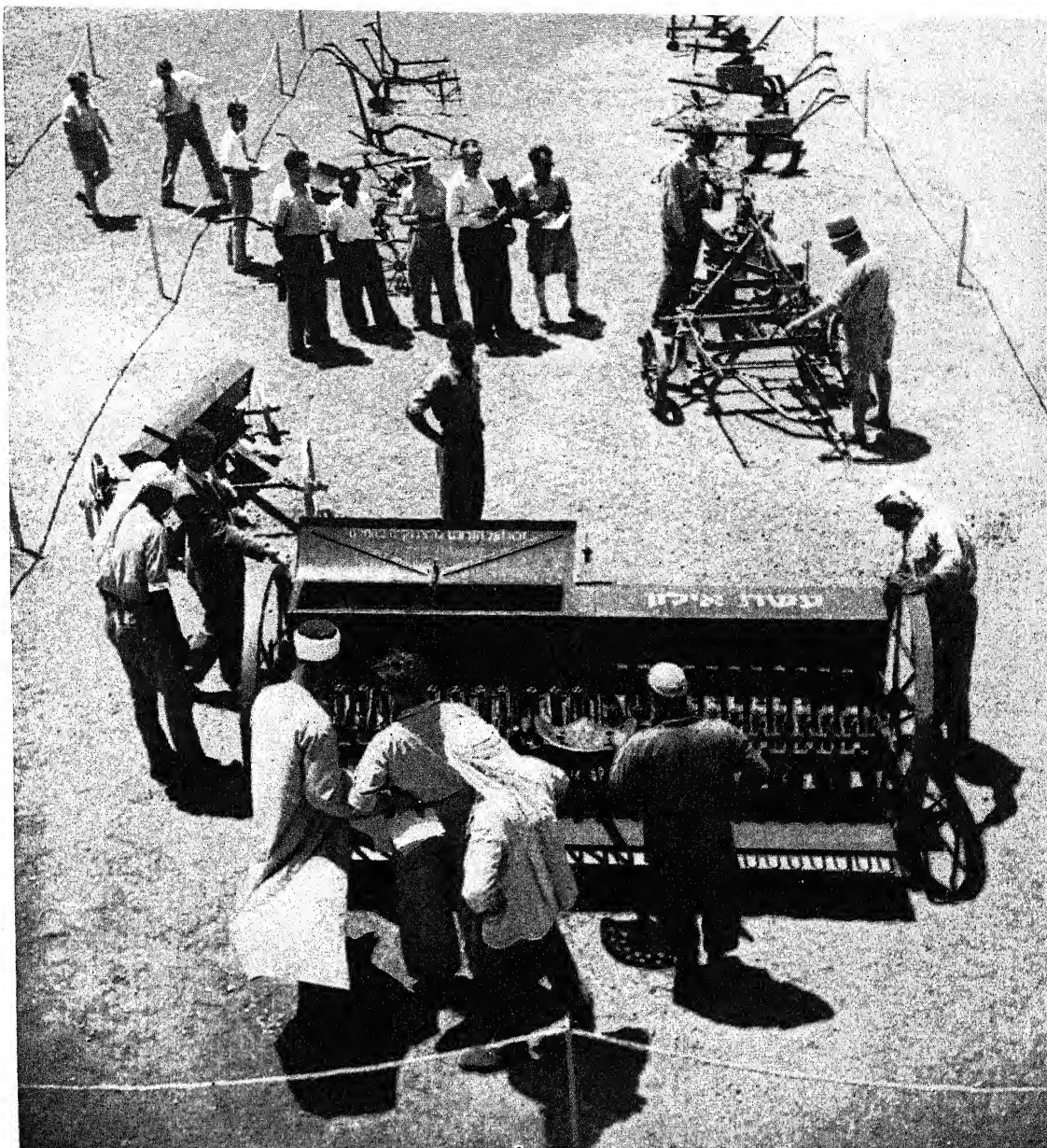
Co-operative dairy Tnuva

*Photo* KLUGER



*Photo* COMERINER

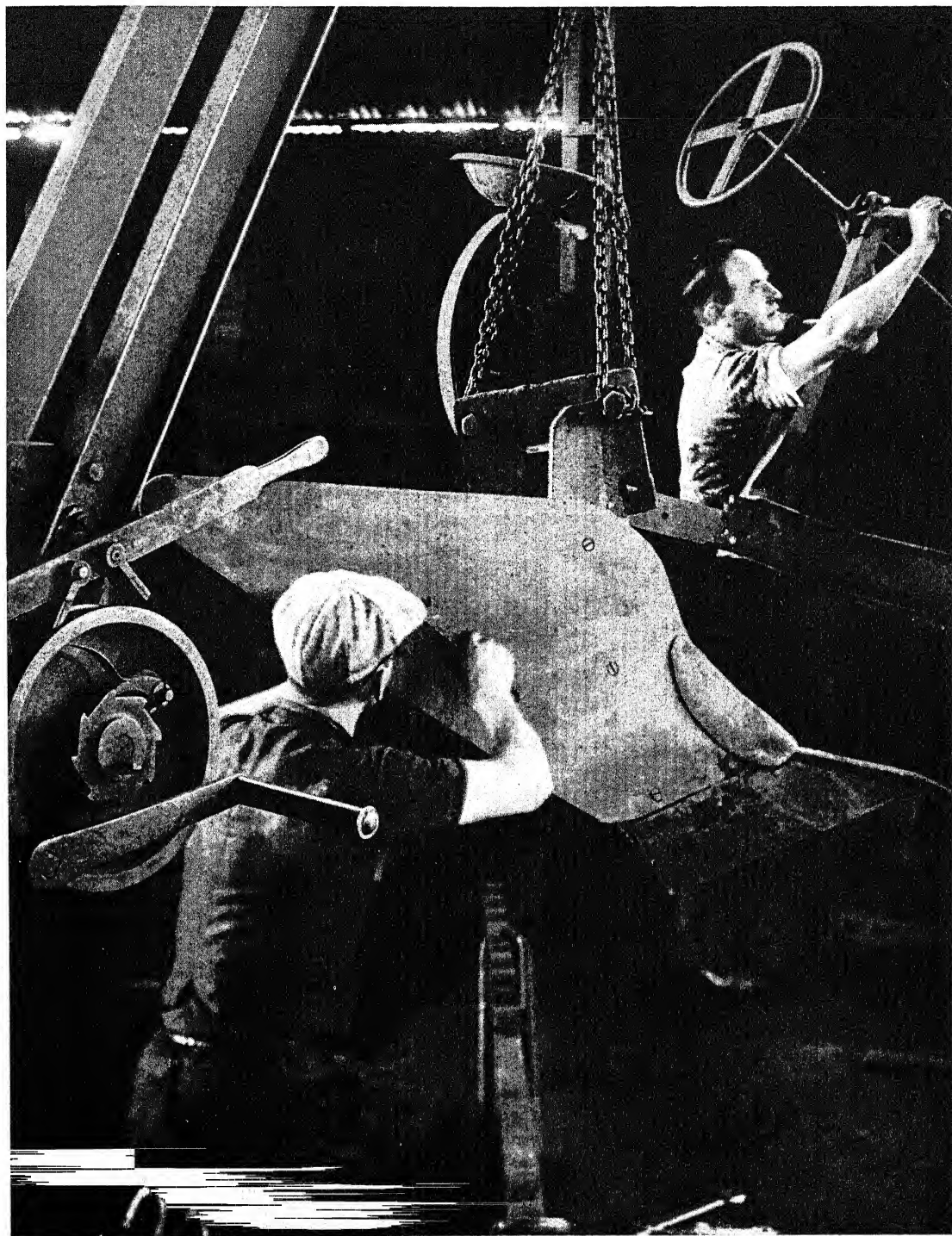
Threshing in youth camp



Agricultural machinery - Ilon Settlement, Galilee

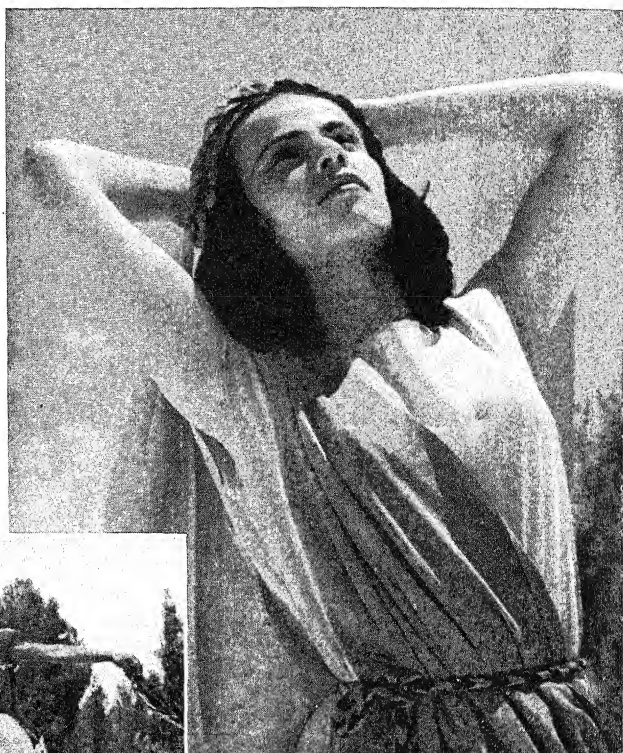
Photo KEREN HAYESOD





*Photo* JEWISH AGENCY FOR PALESTINE

Repairing agricultural machinery



Students in the ballet



*Photos Keren Hayesod*



*Photo* KEREN HAYESOD

A statue of David at Ramath David (named after Lloyd George)



Fighting malaria

*Photo KLUGER*



In the swamps of Hule

*Photo KEREN HAYESOD*



*Photo GIDAL*

Youth Aliyah boy washing the soil



Resting in the shade

*Photo* BLACK STAR

## Arab Economy

Photo BLACK STAR

Arab fisherman of the Sea of Galilee







Arab children at Jewish Medical Station

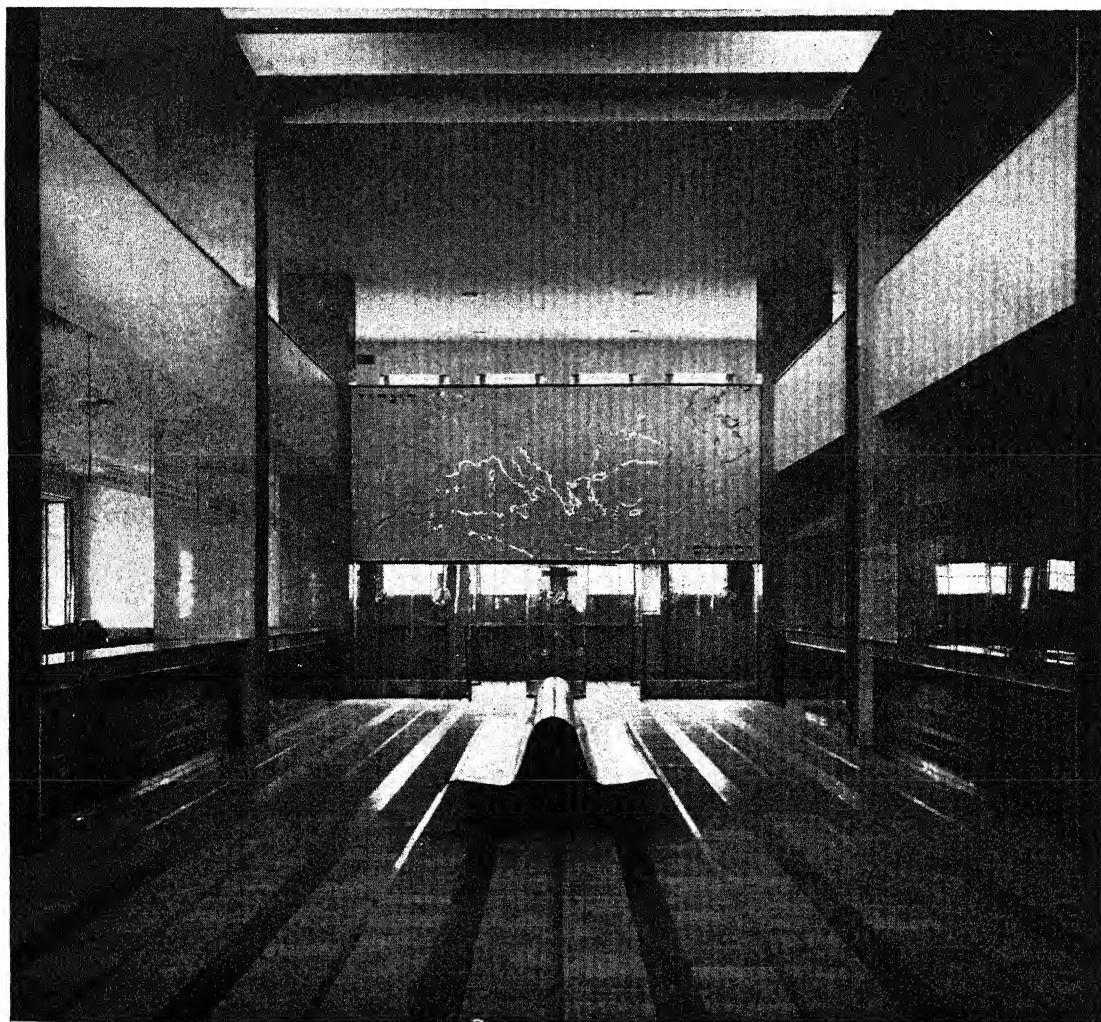
*Photo GIDAL*



## The Supply of Capital

*Photo* HIMMELREICH

Anglo-Palestine Bank, Jerusalem, Banking Hall



Palestine postage stamps

Photo EINKA-PHOTO AGENCY



## Aspects of Palestine Agriculture

Photo BLACK STAR

Modern farming in the Plain of Jezreel





Citrus grove and settlement

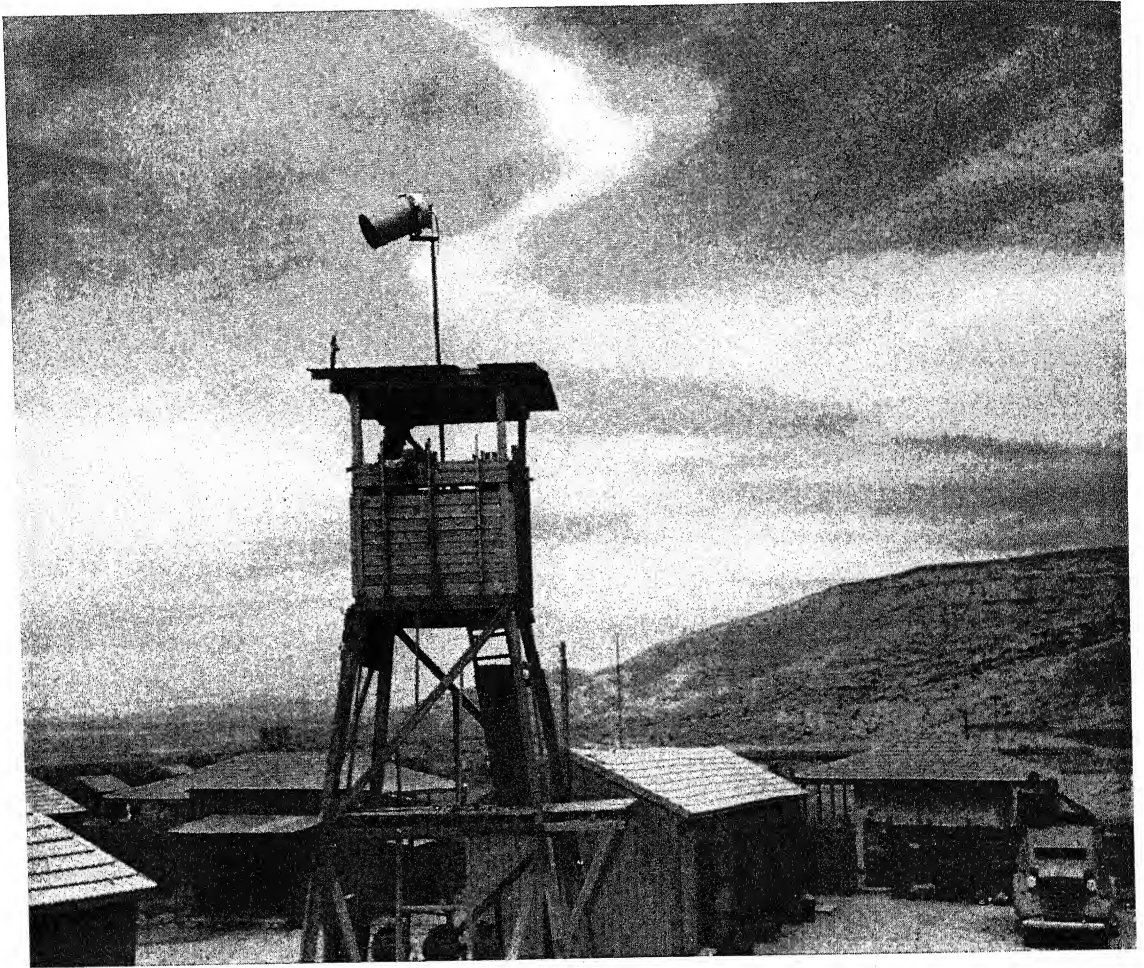
*Photo BLACK STAR*



*Photo* WEISSENSTEIN

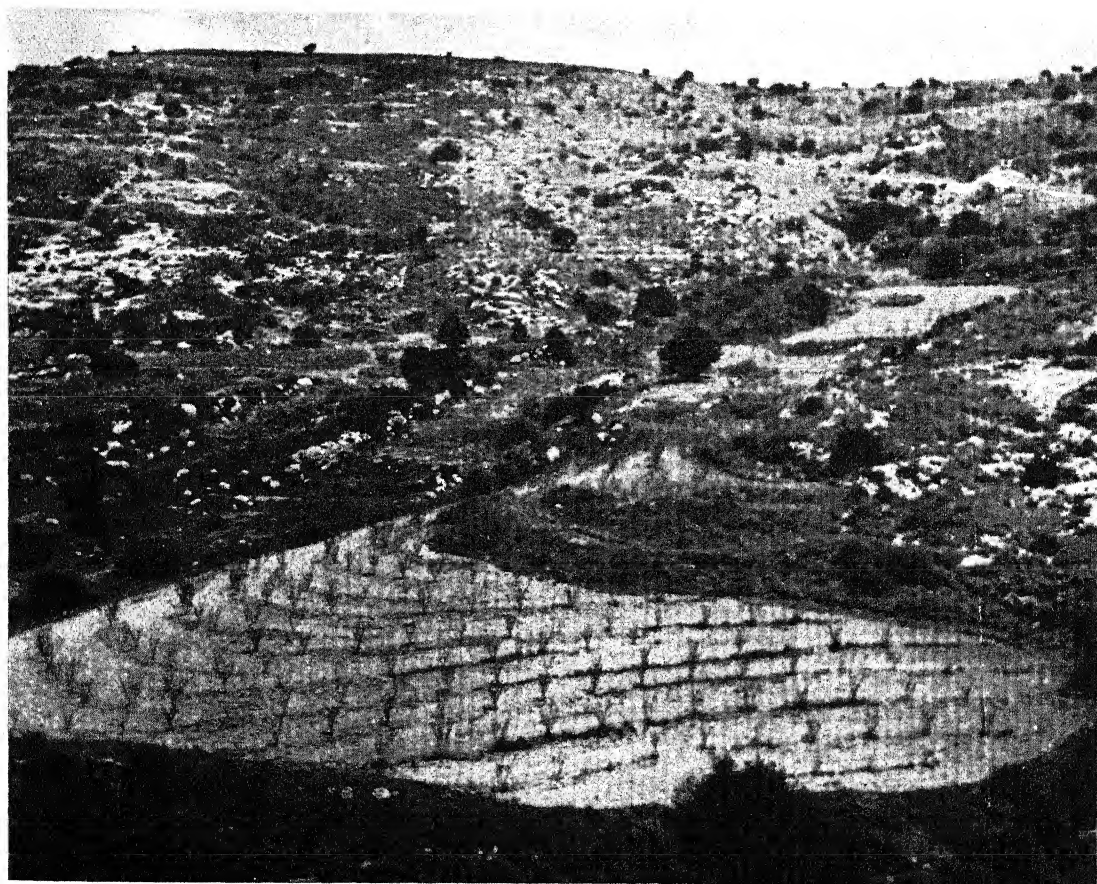
Ein Geb fishing collective (on Lake Kinnereth)





Watch tower at Ein Geb

*Photo* BLACK STAR



*Photo* SCHWARZ

Orchard, communal settlement of Chanita



Banana crop at Afikim collective settlement

*Photo KLUGER*



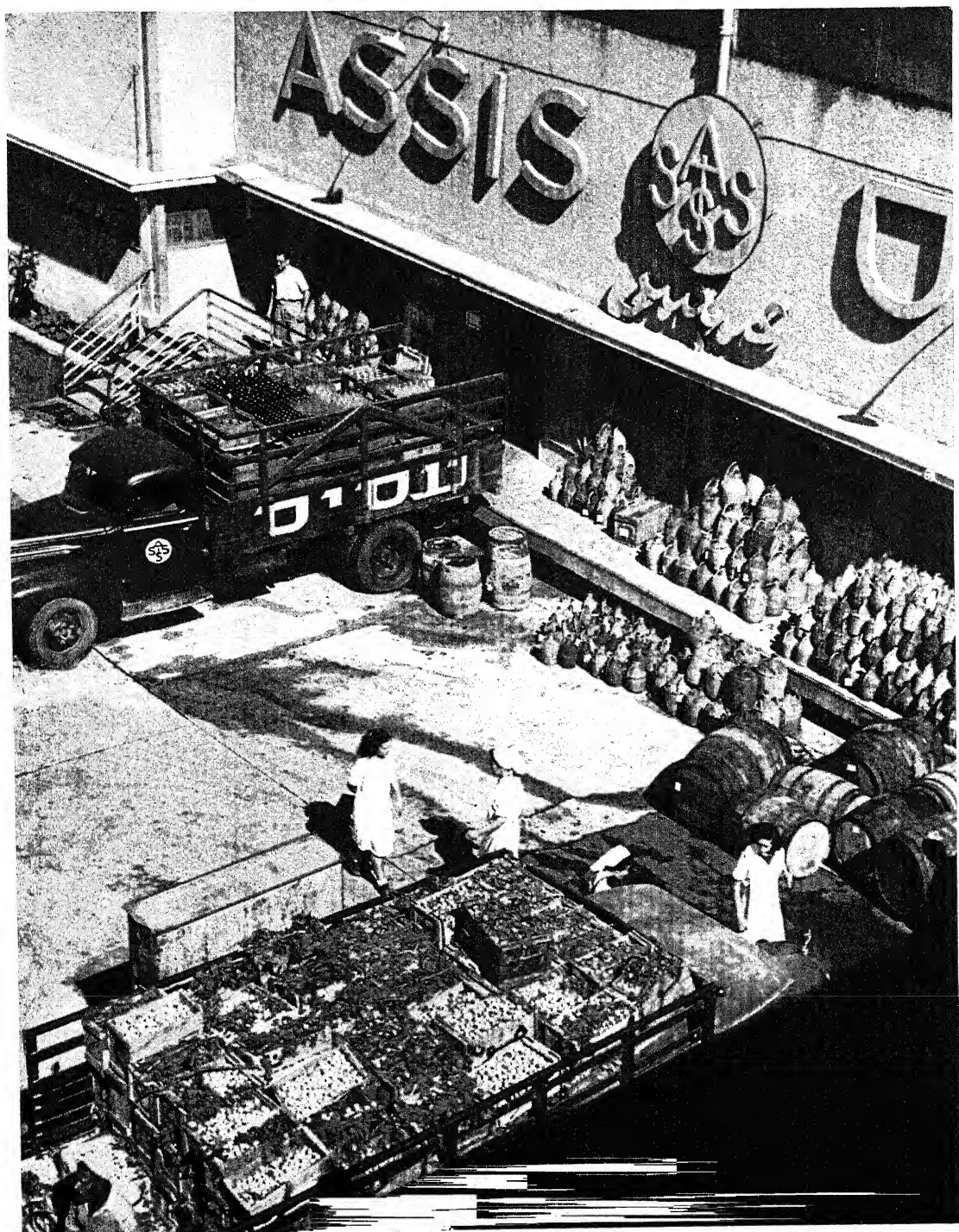


Photo GIDAL

The Assis Palestine Fruit Products Co. at Ramath Gan



Assis fruit products

Photo HIMMELREICH



*Photo KLUGER*

Water course

## The Dead Sea and the World Potash Industry

Dead Sea, North Shore

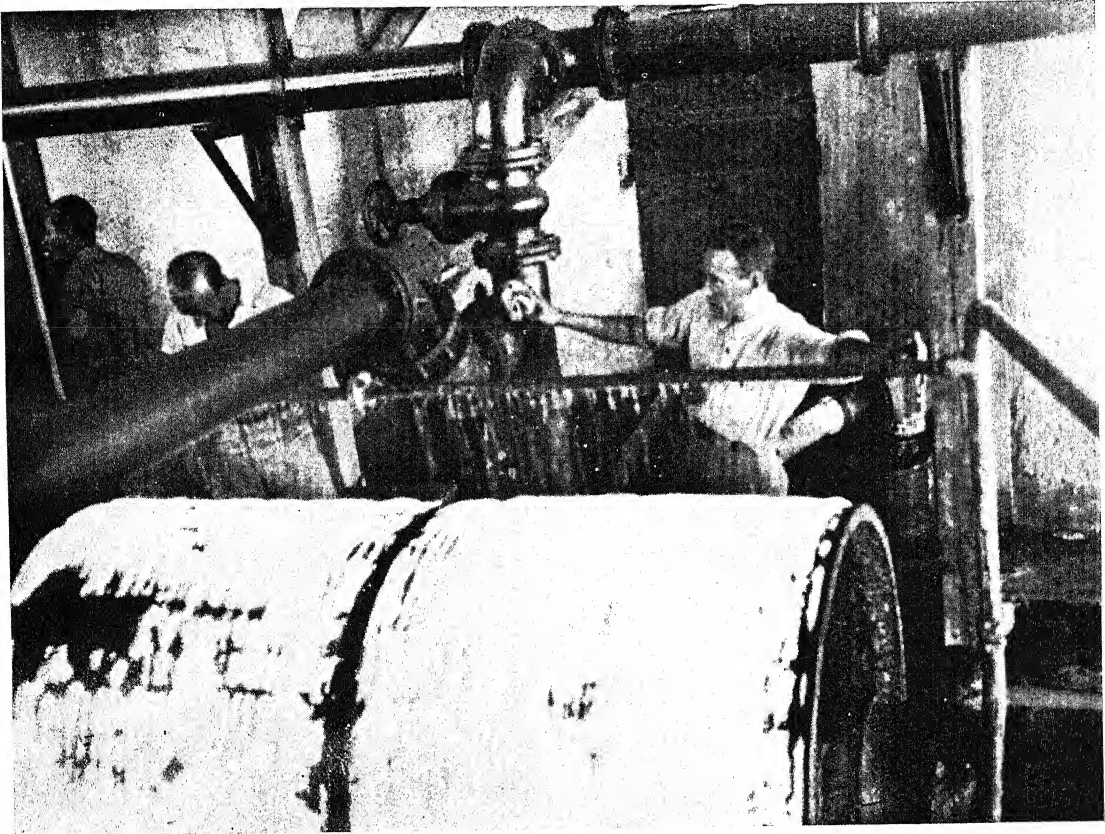
*Photo JEWISH AGENCY FOR PALESTINE*





Photo JEWISH AGENCY FOR PALESTINE

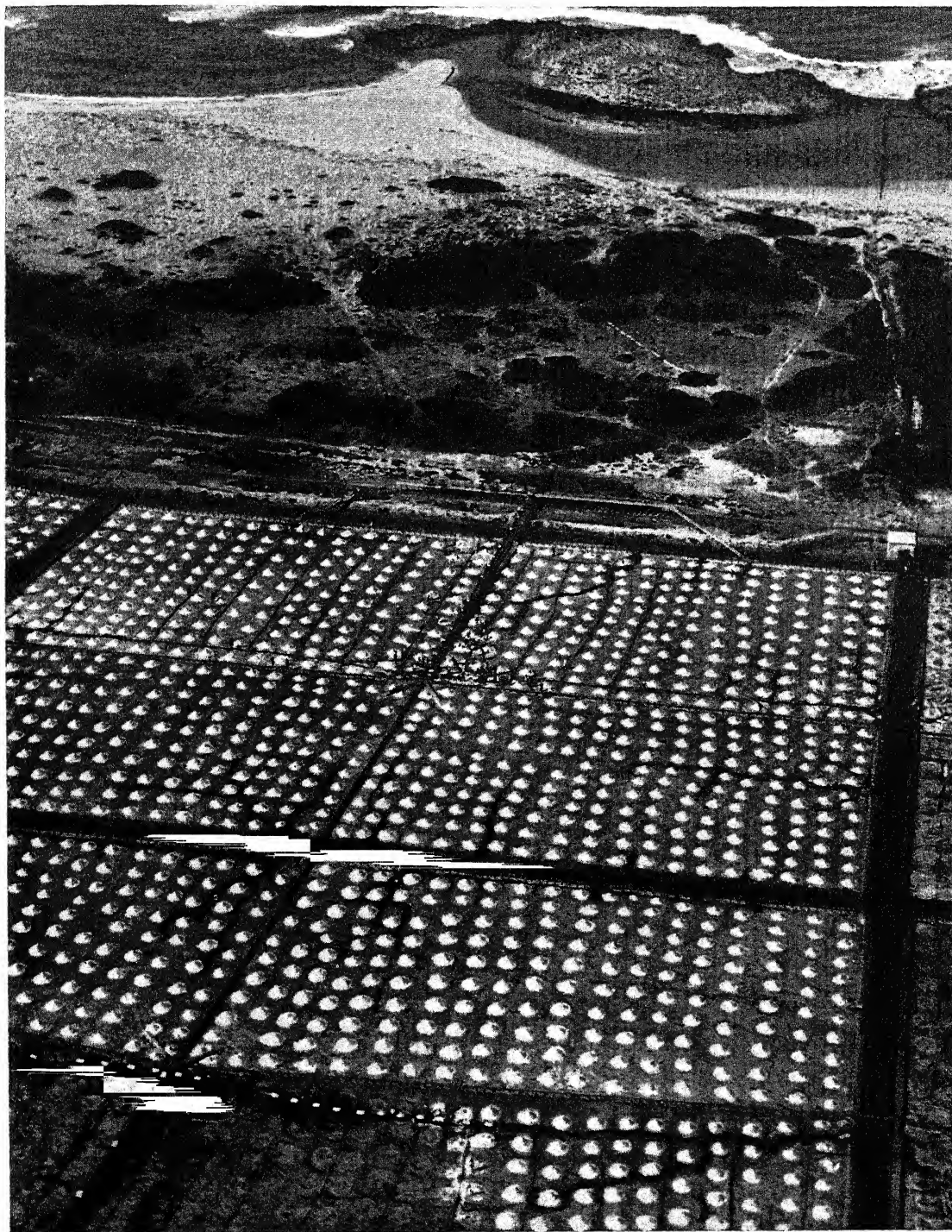
Inside Potash Works





New salt pans

*Photo JEWISH AGENCY FOR PALESTINE*



*Photo* PALESTINE HOUSE

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Salt works, Athlit

## Palestine and the Economic Development of the Middle East

Zionism is one of the major factors that have determined the economic evolution of the Middle East since the end of the last war. Jewish energy, skill and capital have been directed toward Palestine, a small corner of the Middle Eastern countries that were just awakening to political freedom and economic progress. The result in every field affected by Jewish colonization has been very great, especially if measured by the scale of development in the surrounding countries during the same time. Arid land and malarial swamps were turned into blossoming fields and groves, barren slopes were covered with fruit trees and forests. The first years were years of relentless struggle against difficulties that seemed insuperable and often against the opposition of the experts and 'realists.' Gradually, however, the achievements of Zionism appeared even to the incredulous in their true light and stature.

### The Impact of Zionism on Palestine.

And so, as the dark clouds of Nazism started to cast their shadows upon Europe, Palestine was ready to absorb tens of thousands of Jews, whom fortunate circumstances enabled, in the years 1933 to 1939, to leave a continent which was to become the graveyard of millions of their people. They now came to a country which the work of the first pioneers had already rendered hospitable to them. They brought skill, knowledge, and also some machinery and plant, which was the only means of recovering part of the wealth some of them had to leave behind, thus contributing to the industrialization of Palestine, where up to that time industrial activity had not been on a considerable scale.

When war came, Jewish Palestine, though still in the process of growing, had succeeded in becoming a relatively advanced economic organism with a balanced distribution of activity between agriculture, industry and general services. In less than 25 years, Zionism had laid sound economic foundations for the support of 500,000 people on a standard that was far above that of the surrounding countries.

Thus during the critical phase of the war, when every ounce of effort was necessary to tip the scales against the Axis, Jewish Palestine was in a position to contribute its share in men and services. In the economic field, the Jews were able to operate the existing industrial plants to the utmost of their capacity, and to create new installations and processes. Palestine was allowed to play a prominent part in ensuring supplies of civilian and military goods to the Middle East at a moment when shipping was scarce and such supplies essential.

To-day, through the achievements of Zionism, though still incomplete in many fields, Palestine has become a great economic reality. The 'absorptive capacity' of the country has been proved to be as much a human factor as a material one. An example of development has been shown to the neighbouring countries, should they care to apply to their own problems the means, methods and ideals which have helped Zionism to succeed. But apart from its importance as a demonstration of human effort and achievement to Middle Eastern countries, Jewish work in Palestine in the last quarter of a century has brought to these countries numerous economic advantages. Its progress in the future may help appreciably in their own economic evolution, if political considerations do not intervene to hamper such a possibility.

### Economic facts about the Middle East.

During this war, the world has become conscious of the 'Middle East,' as the fortunes of battle demonstrated its vital importance in the strategy of the United Nations. Coloured by the powerful interests involved—some more permanent, others of a rather transient nature—judgment as to the present and future of the Middle Eastern countries was liable to be subjective and to be influenced by a provisional concourse of circumstances. It is, therefore, essential to a sound view of the Middle East and its prospects of development, to try objectively to bring to light the real facts that form the basis of its present economic and social structure.



The term 'Middle East' has not yet a precise and definite meaning and has come to connote a larger or a smaller number of countries between the Eastern Mediterranean and India. In this article the Middle East will be considered, in its most restricted sense, to comprise the central group of countries consisting of Egypt, the four Syrian states, Lebanon, Syria, Trans-Jordan and Palestine, and Iraq. Turkey in the North, Iran in the East, and Arabia in the South, though geographically neighbours, are only rather loosely connected with this central group, and their economic and demographic relations with them are more or less 'tangential' and not far closer, in most respects, than their relations with the other countries of the world. Yet even in this restricted sense the Middle East still covers a vast area. It amounts to one and three-quarter million square kilometres, distributed as follows:

	Sq. km.	Sq. km.
Egypt		1,000,000
Lebanon	10,000	
Syria	171,000	
Trans-Jordan	90,000	
Palestine	<u>27,000</u>	
The four Syrian States		298,000
Iraq		<u>453,000</u>
Total		1,751,000

This area is mostly arid and uncultivated. Huge stretches of desert divide the Middle East into its three constituent regions which thus do not form, from the economic point of view, a single block, but rather loosely connected links of the same chain. These three regions, Egypt, the Syrian States and Iraq, have rather difficult land routes connecting them. They are more neighbours to each other through the seas than across the deserts stretching between them. And, in that respect, they are often nearer to other maritime countries than to one another. Thus, for example, Iraq is nearer to India through the Ocean than it is to Palestine through the desert or the Red Sea. This is a major factor that will always influence the orientation of their economic development.

A common characteristic to all these Middle East countries is that their cultivated land at present is only a small fraction of their total area. The total cultivated area<sup>1</sup> amounts to

about 70,000 square kilometres subdivided as follows:

	Sq. km.	Sq. km.
Egypt		24,000
Lebanon	2,000	
Syria	15,000	
Trans-Jordan	5,000	
Palestine	<u>9,000</u>	
The four Syrian States:		31,000
Iraq		<u>15,000</u>
Total		70,000

But a more important fact, as yet, is that the cultivable areas of these countries are still far larger than the areas bearing crops at present. Various experts have given different estimates for the cultivable areas of Middle East countries, which was only natural on account of the difficulty of gathering information about these questions. But the various estimates are sufficiently near to one another to allow some conclusions. According to these estimates the total cultivable area of the Middle East is somewhat more than 200,000 square kilometres, subdivided as follows:

	Sq. km.	Sq. km.
Egypt		34,000
Lebanon	6,000	
Syria	53,000	
Trans-Jordan	9,000	
Palestine	<u>12,000</u>	
The four Syrian States:		80,000
Iraq		<u>92,000</u>
Total		206,000

Comparing the figures of cultivable to cultivated areas, one is struck by the huge scope for agricultural development, especially in Syria and Iraq<sup>2</sup>. The prospects of future expansion are the more important as most of the cultivable areas are irrigable. The possibilities of irrigated

<sup>1</sup> The figures given for cultivated and cultivable areas have been taken for Egypt from the Statistical Handbook regularly published by the Egyptian Statistical Department. For the other countries they have been taken mainly from: (a) *Statistical Handbook of Middle Eastern Countries*, published by the Economic Research Institute of the Jewish Agency for Palestine (Jerusalem, 1945), (b) *The Economic Development of the Middle East*, by Dr. Alfred Bonnè (Jerusalem, 1943)

<sup>2</sup> The figure given for Iraq is an estimate of the crop area in a given year, as a large part of the cultivated area is not under crops every year.

agriculture are very large and there lies the basic source of wealth of the Middle East. One has only to consider the achievements of Egypt in this field to measure their scope and importance. It is thanks to irrigation that Egypt, with only about one-third of the total cultivated area of the Middle East at present, has been able to maintain nearly two-thirds of the total population of the Middle East, distributed as follows in 1942-43:

	Inhabitants
Egypt	17,230,000
Lebanon	1,060,000
Syria	2,880,000
Trans-Jordan	310,000
Palestine	1,730,000
The four Syrian States	5,980,000
Iraq	3,500,000
Total	26,710,000

A confrontation of these population figures with the figures for cultivated and cultivable land allows one to assess the correct proportions of the economic problems facing the Middle East in the coming years. For all its countries the major problem has been and will be the thorough and rational exploitation of the land. At present, in all these countries, the agricultural productivity per person engaged in agriculture is extremely low. In an estimate recently published<sup>1</sup> it was evaluated for Egypt and Iraq in 1934-35 at about 90-93 International Units<sup>2</sup> per male earner engaged in agriculture (i.e. about £18-19). For Syria it is nearly 98 I.U. (i.e. about £20). These figures are near to one another and characterize a very low general standard of living. In Egypt this is accounted for by over-population on land where primitive methods of agriculture require too many labourers per acre, so that the high yields still correspond to a low productivity per labourer. In Iraq and Syria, on the other hand, this is due to under-population and inadequate capital. Thus the problem for Egypt, if its standard of living is to be raised, is one of reducing the congestion of its agricultural area

and the creation of an industrial sector ready to absorb the population surplus that cannot live on the land; whilst for Iraq and the Syrian States, the main problem is that their agricultural wealth cannot yet be properly exploited for lack of means and for lack of manpower.

This is one of the reasons underlying the spectacular success of Jewish colonization in Palestine. The Jews returning to Palestine were entering a land relatively empty, not only because the 'vertical' exploration of its industrial dimension had not yet started, but also because its bi-dimensional agricultural space was very poorly exploited by its Arab population. By applying capital and science, and by judiciously selecting profitable crops and choosing the right methods of farming, the Jews were able to increase appreciably the productivity of Palestinian agriculture, though only after years of hard pioneering exertions. Their Arab neighbours gradually learnt from their improved methods, greatly assisted by the large amounts of Jewish imported capital that flowed into their hands through land purchase, internal trade, and through Government services paid for by taxes collected from the Jews.

Thus in 1934-35, the productivity of Palestinian agriculture<sup>3</sup> had already reached about 630 I.U. per male Jewish earner engaged in agriculture (nearly £126) and 180 I.U. per male Arab earner (nearly £45). This shows that after only fifteen years of Zionist colonization the Arab peasant of Palestine had reached nearly twice the agricultural productivity of his Syrian, Iraqi or Egyptian cousin, while if Jewish methods could be extended to the whole country the agricultural productivity would have increased sevenfold if compared with the neighbouring countries<sup>3</sup>. Though possessing only 12 per cent. of the total cultivated area of Palestine in 1934-35, the Jews accounted for about 36 per cent. of its total agricultural production. It should be added that the relative importance of Jewish agriculture has increased since.

<sup>1</sup> *The Economic Development of the Middle East* by Dr. Alfred Bonnè (Jerusalem, 1943), pages 35-37.

<sup>2</sup> The International Unit can be defined as the average value of the U.S.A. Dollar over the period 1925-34 when based on the average prices of goods and services prevailing in the U.S.A. in that period.

<sup>3</sup> The productivity figures given for the Middle East countries are strictly comparable since they are computed in terms of U.S.A. average prices on the basis of the actual volume of production. They would be lower if based on local prices though in different proportions for the various Middle East countries.

As already stated, the Middle East countries look more towards the sea and the industrial nations beyond, than they look to one another. The reasons are obvious. Being agricultural countries, their development flows along parallel lines. Their economies are not complementary, but supplementary. They are buyers of manufactured goods and machinery and have to pay for them with exports of agricultural products and raw materials. They all have easy sea outlets and in normal times, when maritime routes are free, they are as near to overseas countries as they are to one another.

Jewish colonization grafted on to the primitive agricultural structure of Palestine a quickly expanding economic organism whose needs were bound to modify the trend of economic relations of the Middle East countries, as well as of those between them and the external world.

In twenty-five years, Zionism brought to Palestine nearly 400,000 immigrants and a capital of about £120,000,000. At the beginning of the war, Jewish economy had already an occupational structure nearly resembling that of advanced European countries. Its continuous expansion created in Palestine an important centre of consumption of agricultural products and raw materials which mostly benefited the neighbouring Syrian states and, to a smaller extent, Egypt and Iraq. It also constituted a market for overseas products, thus appreciably increasing the trade exchanges between the world and the Middle East.

The following figures will illustrate these tendencies.

During the years just preceding the World War the total volume of the yearly imports of the countries of the Middle East was of the order of £63,000,000<sup>1</sup> and the volume of their exports was about £46,000,000<sup>1</sup>. The share of Palestine was nearly 20 per cent. of the total imports though its population is only about 6.5 per cent. of the total population of the Middle East.

Egypt's exports to the Middle East were only about 2.5 per cent. of her total exports and her

imports from the Middle East reached only 1.6 per cent. of her total imports.

For Iraq the respective figures are 12.3 per cent. and 3.7 per cent. But Palestine's share was nearly 40 per cent. of Egypt's imports from the Middle East whilst she absorbed nearly 60 per cent. of Egypt's exports to this region and nearly 40 per cent. of Iraq's exports.

As regards Syria and Lebanon, Palestine supplied about 46 per cent. of their total imports from the Middle East and absorbed 74 per cent. of their exports to it, this latter figure representing 33 per cent. of their total export trade. As to Trans-Jordan, Palestine is her main market absorbing 88 per cent. of her total exports.

In short, Palestine was just before the war the best Middle Eastern customer of Egypt, Iraq, Syria and Trans-Jordan. In these latter states it was moreover the most important consumer of their export trade. Besides, it was a relatively important market in the Middle East for imports from overseas.

With respect to Palestine itself trade with the Middle East did not represent a very large proportion of its total exchanges with the world, covering in 1938-39 only about 17 per cent. of its imports and 15 per cent. of its exports. Of its total Middle Eastern trade, 60-70 per cent. was with Syria, Lebanon and Trans-Jordan. The economic importance to the Middle East countries of their trade with Palestine is more conspicuously brought into evidence if one considers that, Egypt excepted, they all had before the war strongly unfavourable balances of trade with the outside world, whilst they all exported to Palestine more than they imported from it. In 1938-39, the negative balance of trade between the Middle East and Palestine reached a yearly average of £1,500,000 of which £1,000,000 was to the benefit of the Syrian States.

Since the beginning of the war circumstances have reduced to a very large degree trade exchanges between the Middle East and the rest of the world. The Middle East Supply Centre was created to promote local agricultural industrial production and to expand inter-territorial trade so as to reduce to the utmost the volume of goods to be shipped to the Middle East.

The results obtained were to a large extent conditioned by the basic features of the economic

<sup>1</sup> All export figures given in this article exclude re-exports. Available figures for Iraq exports exclude crude oil though it is included in imports of other Middle East countries from Iraq.

structure of the countries of the Middle East. They were not complementary to each other and in most fields inter-territorial trade between themselves could not be expanded to an appreciable degree, except with respect to crude oil extracted from Iraq's wells and for oil products refined in Palestine and Egypt. In most other fields the volume of goods exchanged between the Middle East countries was considerably contracted, though its value has increased owing to the very big rise in prices. But Palestine still held the largest share in the total and inter-territorial trade of these countries.

In 1943, for which year trade figures have recently been released, the total imports of the Middle East have reached £93,000,000 and their total exports (exclusive of re-exports) £43,000,000<sup>1</sup>. Palestine's share was 29 per cent. both of imports and exports.

The importance of Palestine in the trade of Middle East countries with one another was even more pronounced. It supplied in 1943 30 to 40 per cent. of the imports of Egypt, Syria and Iraq from the Middle East and about 60 per cent. of Trans-Jordan's imports from this region. It absorbed almost the whole of the total exports of Trans-Jordan. It received 51 per cent. of Egypt's exports to the Middle East, 34 per cent. of those of Iraq (exclusive of crude oil) and 50 per cent. of those of Syria. On the whole the Middle East was not Egypt's best consumer as it did not account for more than 11.6 per cent. of her imports and 8.0 per cent. of her exports. Similarly, Iraq took from the Middle East only about 3.6 per cent. of her total imports.

These figures show that, with a slight difference due to the pressure of war circumstances, Egypt and Iraq are still not in very close economic relationship to one another or to the Syrian States, while these latter form together a closer economic unit. Palestine is for them all their best Middle Eastern customer.

A very important feature of the special evolution of Palestine since the beginning of the war, as compared with other countries of the Middle East, will emerge from an analysis of the present structure of their export trade. Before the

war all these countries, Palestine included, were selling abroad mainly products of the fields and farm. In Egypt, cotton was the main item of export. For Palestine it was citrus fruits, while the other Syrian States and Iraq exported mainly agricultural products, animals and animal products. In 1943-44 the main articles of exports of the Middle East countries, Palestine excepted, were still the same; moreover, for Iraq, the exports of crude oil were acquiring an ever-growing importance. But for Palestine the conditions were changed. In 1943-44 her exports were chiefly articles mainly or wholly manufactured. Among them, refined petrol products and Dead Sea chemicals ranked first, but cut diamonds, pharmaceuticals, chemicals and manufactured articles in general were acquiring a growing importance.

This new tendency was a criterion of the new trend of development in the economy of Palestine. Under the impact of war all Middle Eastern countries had appreciably extended their industries, with the encouragement and assistance of the Middle East Supply Centre. It was in Egypt and Palestine, but especially in the latter, that industry made the most spectacular progress.

For Egyptian industry the only information available is of a general nature<sup>1</sup> and no precise statistical figures have been published. For Palestine such data can be obtained, and lately very interesting figures have been released about the industrial censuses carried out in 1940 and 1943<sup>2</sup>. They show that between 1939 and 1942 the total output of Palestinian industry increased from £8,800,000 to £36,800,000. The net output (added value exclusive of cost of material) increased from £3,900,000 to £14,800,000. Of this latter total figure, 77 per cent. was contributed by Jewish industries, 11 per cent. by concessionary enterprises and 12 per cent. by non-Jewish industries. Even if the rise in internal prices is taken into consideration<sup>3</sup>, the preceding figures show an important expansion in the actual volume of industrial production. Most existing industries in Palestine were extended and many new ones were created, chiefly in the

<sup>2</sup> *General Monthly Bulletin of Current Statistics*, March, 1945.

<sup>3</sup> The wholesale price index (1936=100) varied in Palestine between 217 in January and 283 in December, 1942

<sup>1</sup> *L'Industrie Egyptienne et ses Possibilités de Développement* by Albert Dorra, *L'Égypte Contemporaine*, Vol. XXXIX, pp. 409-482

field of food, textile and fashion industries, chemical industries, mechanical industries and diamond cutting.

Some of the newly born industries of Egypt and Palestine are provisional and will not outlive the war conditions that justified their creation. But many others are viable and permanent in character, though they may require to be rationalized and re-equipped to be able to compete with foreign imports.

The consolidation of industry in Egypt and Palestine and its expansion in future is essential to their economic development. It is essential for Egypt to ensure a rise in the standard of living of its ever-growing population. It is essential for Palestine to ensure the proper standard of living to its existing population and to allow the absorption of future Jewish immigrants.

#### Prospects of Future Development.

On the whole, the economic development of the Middle East countries will follow lines whose directions will not deviate much from their general pre-war tendencies, though the pace of their evolution may be quickened in many respects. The main features characterizing all these countries from the economic point of view are related to the fact that their possibilities of expansion are very large in many fields. Though old in terms of history, they are very young from the point of view of economic development and their wealth is still virtually untapped.

In the field of agriculture, as has been pointed out, there are in all the countries of the Middle East, and especially in the Syrian States and Iraq, huge tracts of cultivable lands that are not being cultivated at present. If the necessary capital is made available and the required labour is forthcoming, the agricultural production of the Middle East could be vastly increased, thus making it one of the important agricultural regions of the world. The possibilities of irrigation are large and the climatic conditions favour the growing of high value crops. One possibility among many, if proper care is taken to obtain first quality products, is for the Middle East to become during the Winter and Spring months a big supplier of

fruits and vegetables to Europe at a time when the climatic conditions there prevent local production.

Another important source of wealth for the Middle East lies in its unexplored mineral resources. Among those that have been discovered and that are riveting the attention of the great Powers to the Middle East, petrol comes first. The reserves of crude oil that are known to be present in this region of the world are very large and it is expected that systematic prospecting will prove them to be of even greater importance. The exploitation in the near future of these resources may become a very important factor of economic progress for the countries concerned.

In the industrial field, the prospects of development of the Middle East countries are interesting. Here their progress will take place along parallel lines, though Egypt and Palestine will lead the movement on account of the advance they have already made. Food and consumer goods industries, and mainly those which produce low price articles for mass consumption, may well afford the greatest scope for development. In this respect the evolution of the Middle East countries in most cases will not be complementary, though it need not be antagonistic. As a matter of fact each country will be prominent in its own internal market; in external markets their struggle will not so much be against one another as against India for price goods and Europe and America for better quality goods.

There are further industrial activities in which Palestine may engage and which will remain closed to other Middle East countries in the near future. They cover light capital goods industries and specialized fine industries which mostly rely on technical skill and scientific experience. The achievements of Palestine in these fields during the war, often with inadequate means and imperfect machinery, show what can be done in future if proper equipment and modern plant are available. The Middle East countries will have to rely on the industrial countries of Europe and America for the purchase of the manufactured goods they still need and of the plant, machinery and other capital goods they require to equip their agriculture and their growing industry. They will be able

partly to use for their purchases their sterling assets that have accumulated during the war and that amount to about £600,000,000 for the Middle East. But they will also have to rely very much on their exports of agricultural products and raw materials. Among the latter, crude oil and petrol products of which the Middle East will be an ever-growing producer will obviously be prominent.

In more than one way, the development of the Middle East will be affected by the economic policy that will be followed by England and the United States towards it. Much will depend on the volume and distribution of credits that will be available to these countries, as well as on the share of the British and American exports that will be allotted to them during the first post-war years. Another important factor will be the readiness of the U.S.A. to extend financial help to England in her endeavours to recover her place in international economic activity.

In many respects the expansion in Palestine of Jewish immigration and the development of Jewish economy can only bring advantages to the Middle East. Not only will Jewish capital

flowing on to the Palestinian Arabs help them to raise their own economic standard to the level reached by the Jews, but the Jewish economy itself will be an ever-growing consumer of foodstuffs and raw materials supplied by the neighbouring states. Moreover, the growing capital goods and quality goods industries of Palestine will also be in a position to help accelerate the industrial equipment of the Middle East countries, especially as England and the United States will have to reserve for a long time to come a good share of their exports of such goods for the reconstruction of the devastated countries.

In short, the economic development of the Middle East agricultural countries can only be achieved by co-operation between them and the more advanced industrial countries. Zionism has been a powerful economic factor whose effect was to allow the creation among the Middle East nations of a progressive industrial structure whose growth can only benefit their whole economy, accelerating the pace of its evolution and ensuring to them an easily available market for their main export products.

## Supply of Capital in Palestine

It would be quite as wrong to present the economy of Palestine as consisting of two entirely separated and independent branches, a Jewish and an Arab economy, as it would be to deny that in many important respects the two elements of the population are living their own economic lives with their own separately recognizable resources, organization, tradition and aims. There is much more interdependence than meets the eye. It is virtually impossible for the Jews, even if such were their intention—which they rightly deny—to exclude the Arabs from the benefits of their own economic development. It would be an idle expectation on their part, were they to believe that the Arabs could experience a material economic setback without a considerable reaction to their own detriment. No realistic view of the situation can be taken without recognizing that the two populations have several important economic interests in common and might well strive towards a common solution.

However, no apology is needed for the fact that in the present survey it is mainly the specifically Jewish problems that will be discussed, and the problems of a general and common nature approached in the first instance from a Jewish point of view.

### The Present Position.

There was a time when it was customary, in discussing Jewish credit problems, to go back half a century in history and to show how within an economy, not of scarcity but of unmitigated poverty, not to say misery, a sensible although primitive and small credit system had been gradually built up, patiently overcoming setbacks caused by adverse external conditions and by its own errors of judgment. This story need not be repeated now. The modern economy of Palestine is an established fact and its problems are those of the present and the future.

Those problems can best be approached by dealing separately with the two main sub-

divisions of credit: long-term and short-term credit. There is, of course, no sharp demarcation line between the two; a short-term credit is in a large number of cases granted under circumstances which justify the expectation on the part of the borrower that it will not be called in at maturity; in many respects it assumes, in the course of time, the nature of a long-term credit. Or a credit may be granted for a period which cannot be brought under the definition of short-term credit, say for two or three years. Still, broadly speaking the distinction will be found convenient for the treatment of the subject.

The main source of credit is the accumulated savings of the local public, held in the banks and other credit institutions or lent (in recent times) to the Government and other public bodies or private and semi-public enterprises. It is not customary nowadays to look on bank deposits simply as the savings of the public; their ups and downs are governed by factors which have no necessary connection with the public's willingness to save; however, in the comparatively simple economy of Palestine, the old conception will do.

Palestine is not dependent upon external resources for any large proportion of its credit. In this respect the *Keren Hayesod* (Palestine Foundation Fund), which plays a not unimportant part in the credit structure, is in a particular position. On the one hand, it is true that it derives the bulk of its revenue and, therefore, of its accumulated means, from contributions collected abroad, but on the other hand, those funds form a capital on which neither interest and dividends nor capital repayments are due, and they are, therefore, so to say, naturalized. It is obvious that the funds of the Palestine Jewish Colonization Association (PICA) are in a similar position. The Government, too, has done hardly any borrowing abroad: there is only one external loan in existence which now stands at the comparatively unimportant balance of about £3,500,000. As against this, the Government has recently borrowed not less than £5,000,000 in the country in the course of



one year. The Municipalities have not borrowed abroad (if a small amount borrowed at some time in the United States by the Municipality of Tel Aviv and since long fully repaid is to be disregarded). It is true that a moderate part of the commercial credit is being provided by foreign banks, but the local deposits, held by those banks, are far in excess of the credits granted by them, so that the latter may be said to be provided out of local resources.

#### The Banks.

Commercial credit comes, of course, within the province of the banks. It is granted on conditions and according to methods similar to those generally prevailing. It is, on the whole, not more expensive than in England, five per cent. being the cost of a sound credit in one of the larger banks. At no time has its volume been insufficient, and at the present time it may be said to be abundant. Indeed, if there is any apprehension connected with this form of credit, it lies in the large volume in which it is potentially available and in the multiplicity of the channels through which it may be acquired. Much was done before the war to reduce the number of small banks which formed a highly unsatisfactory feature of the credit structure, but it is generally recognized that the process could, with advantage, be carried somewhat further yet. The argument has sometimes been heard that there exists a stratum of small traders whose credit needs can be better cared for by small banks than by large. This carries no conviction.

The commercial credit of smaller shopkeepers, artisans, etc. is being supplied in sufficient measure by the co-operative credit societies which dispose of abundant means for the purpose.

#### Industrial Credits.

It is in the nature of things that commercial credit should be of a short-term character only. The same cannot be said of industrial credit. The short-term part of it presents no problems of importance, either as to its methods, its cost or its availability. Every bank is quite happy to provide it and there exists even a special

institution for the purpose, sponsored by the Manufacturers' Association. It originated in the need which was at some time felt by the small industrialists to secure for themselves a sufficient measure of credit which they felt uncertain of finding in the general commercial banks. While those particular conditions are, if they ever existed, a thing of the past — the institution, once it had come into existence, participated in the general development and extension of industry. It will now have to find and maintain its place among the general credit institutions whose knowledge of industrial conditions and willingness to provide the credit needs of industry are not smaller than its own, whereas their means are more ample and their ability to reduce the cost of credit a wider one. This problem, however, is a comparatively small and simple one, compared with that of the long-term credit needs of industry. Palestine has this latter problem in common, of course, with all industrial countries, and, like all other countries, it is aiming at a solution without possessing full practical experience of the extent of its problem. The 'Macmillan gap' which impressed itself so much on the public mind when attention was drawn to it at the time, seems so obvious that the necessity of a remedy appears to be beyond discussion. The expanding small and medium industrial enterprise cannot for its additional needs apply to the public capital market, which is open only to the larger undertakings; no short-term credit can serve the purpose; no machinery exists for supplying the need; consequently the development of industry is hampered; consequently machinery must be created for providing long-term loans and capital to small and medium-sized industrial undertakings. The argument seems unanswerable. In the inter-war period most European and a number of Dominion and other Governments responded to the situation by setting up special institutions for the purpose of providing for this particular need. In practically all cases the funds were made available by the Government or under Government guarantee, and the institution was naturally conducted under Government auspices in some form or another. Hardly any of these institutions had really come into their stride when the second world war broke

out, and during the war such capital needs as expanding production brought about were, as a rule, financed through more direct methods. Although the volume of practical experience is, therefore, still disappointingly slender, the academic argument remains an impelling one. An impressive attempt has been inaugurated in Great Britain to meet the situation through the combined efforts of the larger banks in co-operation with the Bank of England, and one may look forward with considerable interest to the first report on the activities and achievements of the new institution. Palestine is going a similar way: the Anglo-Palestine Bank has formed a subsidiary, in which the *Keren Hayesod* participates with one-fourth of the capital (of LP200,000), the special purpose of which is to provide long-term credits to industrial undertakings which, in the post-war period, will have to extend their plant and replace obsolete equipment. The *Keren Hayesod* will also in specific cases guarantee some part of the risk. It is expected that sources will be found to increase the funds of the new institution when its present means are exhausted, but the first steps on the path of its practical experience have yet to be taken. Some precedents, it ought to be added, are available from the experience of the Anglo-Palestine Bank (in conjunction with the *Keren Hayesod* and the Industrial Bank), mostly on a small scale; while these are encouraging they are not conclusive. The Palestine Corporation has also gained some experience in the field, but likewise hardly of a conclusive character.

#### Credits for Citriculture.

The two main branches of Jewish agriculture, citriculture, and mixed farming, call for separate treatment.

Citrus planters have for the last thirty to forty years enjoyed seasonal cultivation credits which they repaid out of the proceeds of their crops. The better part of these credits was granted by three or four of the larger banks, and among the Jewish growers a large proportion was obtained through the channels of the co-operative marketing societies. The lenders were under the illusion that not only were the members mutually liable in law, but that they knowingly

and willingly shouldered this mutual liability. The matter was never put to the test, as all advances were easily repaid. Difficulties arose, however, when the war interfered with marketing. The cultivation advances of the year 1939 were ultimately repaid, but with considerable difficulty and mutual recriminations. These difficulties have made both the banks and the growers doubt the wisdom of the future financing of the cultivation of the groves through the medium of the marketing co-operatives. An alternative efficacious way has, however, not yet been devised.

Financing the actual marketing (picking, packing, transport, etc.) is a comparatively simple business which need cause no problems.

During the war the three lending banks made large annual advances to the citrus growers in order to enable them to continue the cultivation of their groves. Those advances were guaranteed by the Government, which, at the end of each season, repaid them. The last of these advances was granted in the summer of the present year, 1945, and the Government will now have to decide on the fate of this accumulated debt which amounts, roughly, to four million pounds. The best procedure would probably be to free the citrus industry of this dead weight and to obviate an acrimonious discussion about the respective priority rights of the Government and other lenders through a complete cancellation of the entire indebtedness. It would remain open to the Government, representing the taxpayers, out of whose pockets this support to their country's most important industry has been forthcoming, to recoup itself and make the industry repay the taxpayer's contribution, or an adequate part of it, through levying in future a moderate cess or export tax on all citrus fruit exported. Insofar as those growers who had not enjoyed the benefit of the Government guaranteed loans might argue that there would be no justice in subjecting them to this tax, it would be quite easy to devise a system of exemption.

A solution of this kind is all the more required as many citrus groves will, in the forthcoming seasons, require disproportionately large cultivation advances so as to put the groves back into full production. Dismantled packing houses and similar appurtenances of the groves will

also have to be replaced or renewed. There is a credit problem here which calls for early attention.

Apart from the fact that in the Jewish sector the marketing co-operatives will continue to play a certain part (although hardly the same preponderant part as before the war), there are few differences of importance between the credit problems and needs of this sector as compared with the Arab sector, which is of about equal magnitude.

#### Mixed Farming Credits.

As against this the credit problems in the Jewish and Arab sectors of the mixed farming industry are widely different.

An overwhelming part of Jewish mixed farming is carried on in the co-operative settlements of various types sponsored by the Jewish Agency. What are the credit needs and problems of this sector? Theoretically there ought to exist no long-term credit problem at all. There is no need to acquire land as all the land is provided by the *Keren Kayemeth*, which collects an annual rent. Buildings and equipment, again, are provided by the *Keren Hayesod*, and the cost is repayable in easy annual instalments. If there still remains a problem, there are two main causes:

- a. The *Keren Hayesod* does not, in the majority of cases, provide at once the full complement of buildings and equipment, nor even anything like it;
- b. In any case, such buildings and equipment are provided only in accordance with a certain minimum plan and whatever the settlement will, in the course of its expansion, wish to add to this, it has to provide itself out of such surpluses as it can produce.

It does not, on the whole, appear to be a good system to supplement insufficient *Keren Hayesod* equipment through direct long-term loans to the settlements. It would seem preferable to finance the *Keren Hayesod* itself for the purpose. The second need, however, deserves (and indeed receives) a great deal of sympathy and consideration. Several institutions, especially the *Nir* Company, the Anglo-Palestine Bank, the Workers' Bank and the Central Bank for Co-operative Institutions, share this task

between them. In most cases pledges of sources of income have to take the place of mortgages on land and buildings which are difficult to establish owing to the overriding rights of the two Funds. Unfortunately, a large number of settlements have been tempted, during the last few years of abundance of money, to receive short-term loans from smaller banks and other sources, which they have invested in buildings and improvements. To some extent the larger institutions can remedy this situation through extending long-term loans, but where a settlement has overreached itself in borrowing, the lenders who imprudently lent their funds without enquiring into the use that was made of them will have to exercise patience. They may occasionally dislike the position, but they will have little choice.

The short-term crop credit calls for little comment.

There is a range of loans which is neither short nor long: three, four or five years. The term 'intermediate credit' will serve for it. These loans are granted in order to finance improvements and extensions which make their effect felt within the short period of the lives of these loans. Whether there is so wide a scope for these 'intermediate' loans as the borrowers were at some time inclined to believe, may be doubted.

The Arab cultivator would, before the war, have offered a wide field for long-term agricultural credit, which would usefully have replaced his indebtedness to private money-lenders, had such credit been energetically and efficiently organized. This would have called for a network of Arab co-operative societies and, first of all, for a general revision of the cultivator's indebtedness. No such organization has ever been attempted on any sufficient scale and the Agricultural Mortgage Company of Palestine, formed with the support and under the auspices of the Government, has not even made an attempt in that direction. The war has changed the situation of the small Arab farmer out of all recognition. Having received a multiple of the pre-war prices for all his agricultural produce, be it cereals or vegetables, and having spent on his own needs but a modest proportion in excess of his pre-war expenditure, he has, on the

whole, been able to free himself of indebtedness and to accumulate some fair savings. If he will not dissipate these savings, as the pessimists expect, there will be room for large scale Arab agricultural credit only, when new irrigation schemes come into being.

#### Personal Credit.

Personal credit is granted in the Jewish sector by the Co-operative Credit Societies. It has already been mentioned that for the purpose they dispose of means far beyond present needs.

#### Housing Finance.

The General Mortgage Bank of Palestine, an affiliation of the Anglo-Palestine Bank, is the leading institution in the field of urban mortgage credit. Its debentures have a ready market and it disposes of a large cash balance which it can put at the service of such all too moderate housing activities as have already been inaugurated and will be started in the near future. However, neither this Mortgage Bank nor any similar institution will be able to cope with the real credit needs of popular housing. These banks have to find their money in the private capital market under conditions which force them to demand a rate of interest and a margin of security which are not in accordance with the exigencies of efficient popular housing. There is no other solution on a grand scale than the use of such credit as the State can procure. Until very recently the Government of Palestine has shown no understanding of its duties in this field, and, although the first symptoms of some measure of understanding are now observable, it would be too much to hope that the present administration will devote to this vital need anything like the energy and drive which are required and which, in Great Britain and other countries, are self-understood. Certain makeshift measures will be required to deal with the most pressing needs. In the Jewish sector an institution for second mortgages has been set up under the auspices of the Jewish Agency and with the co-operation of the *Histadruth* and the General Mortgage Bank, but its means are, as yet, out of all proportion to the necessities of the situation and it is difficult

to see how they can at present be materially increased. Even this is not enough; some credits beyond even the limits of a second mortgage are required and the *Keren Hayesod* provides them. There, again, the amounts available are insufficient. This whole makeshift structure cannot take the place of an organized community doing its duty towards its housing needs through its indicated agency, the Government. All that one can say is that it is very much better than nothing at all. For private building which can pay the interest imposed by the money market and can supply the margins which a reasonably prudent policy requires, the machinery of the General Mortgage Bank, supplemented by a very liberal measure of mortgage credit made available by private investors and by some smaller institutions (first of all the South African Binyan Society) may well prove sufficient.

#### Municipal Loans.

Municipal credit has slowly developed in the inter-war period and has not reached the capital market. The somewhat fantastic experiment of the Municipality of Tel Aviv, some twenty years ago, of contracting a small loan in the United States has never been repeated. The funds required, which until recently ran into an aggregate figure of, perhaps, half a million or less, were provided by Barclays Bank (D. C. & O.) who, as Government bankers, could hardly refuse to entertain the most urgent propositions, and by the Anglo-Palestine Bank who, for somewhat similar reasons, dealt with the needs of a few Jewish municipalities and local councils. There are, however, obvious limits to the ability and willingness of commercial banks to extend long-term loans to municipalities. The road to the capital market, not even the local, let alone the foreign, has not yet been found and the needs – and even more the appetites – of the various municipal bodies are enormous. Tel Aviv alone has a seven million plan and the programmes of the other municipalities are, if not quite as ambitious, very large indeed. A study of most of these plans will probably reveal that, while the magnitude of the amounts involved may, at a first glance, cause some concern, the chances

that capital repayments and interest will be forthcoming are reasonable enough.

However, as things are at present, these plans will have to remain on paper. The banks obviously cannot deal with them. The local capital market could do so to some extent, but municipalities are not prepared to accommodate themselves at present to the rate of interest which the local private investor will consider adequate. They are receiving some modest first instalments from the Government out of the proceeds of the new Premium Bond loans at a rate of interest (3%) at which no municipality could hope to borrow in the local market on its own merits. This is admirable, but it is not quite clear what ultimate organization of municipal credit the Government has in mind. Will the Government of Palestine shoulder the whole burden of providing this credit? Such a 'totalitarian' solution would be surprising. If not, where is the present method to lead?\*

#### Government Credit.

Government credit was a simple subject to deal with until recently. One loan for the amount of £4,475,000 was contracted in the year 1927 and was placed in the London market. Although the British Government granted its guarantee, the interest was fixed at 5% and the intelligent subscribers reaped the reward of a substantial premium.

This loan was redeemed in 1942 and a new loan made for an amount of £3,600,000 bearing interest at 3% per annum.

During the War several plans of Government borrowing were discussed, partly as a means of combating inflation and partly in order to provide for development and needs. After long hesitation and in the face of some objections on principle, it was decided to issue Premium Bonds. These issues have proved fairly successful and up to the present an amount of five million pounds has been found in this way. More will probably follow. All this money has been found within the country.

\*Since the present article was written it has become clear that for some time to come there is no prospect of the proceeds of any Government borrowing being made available to municipalities, as they are needed for the Government's own purposes.

#### Central Bank Problem.

There is one problem which is often mentioned in connection with Palestinian credit organization and which ought not, therefore, to be entirely omitted from the present general picture. It is that of the Central Bank or the lack of a Central Bank. It is argued that a Central Bank, through making rediscount credit available, would relieve local banks of at least part of the burden of liquidity and would thus enable them to cheapen credit to trade and industry. It would also, it is held, generally direct banking policy. The following points, however, merit attention in this connection:

1. The bulk of Palestinian banking is in the hands of foreign banks which would feel neither the need nor, probably, the inclination, for a long time to come, to resort to the discount facilities of a local central bank. Competition between them keeps debit interest rates reasonably low.

2. Following recent trends, it is to be assumed that the central bank would be virtually a Government institution. Those advocating the immediate formation of such a bank would do well to ponder whether they would wish to strengthen the hold of the present administration over the country's economic life.

3. If the population, as would appear reasonable, is to be granted some measure of influence on the policy of the Central Bank through the setting up of a Board of Directors, it might prove a well-nigh impossible task to reconcile Arab and Jewish wishes and interests or what various representatives would believe to be their interests; the Bank and its policy would be a centre of friction and dissension.

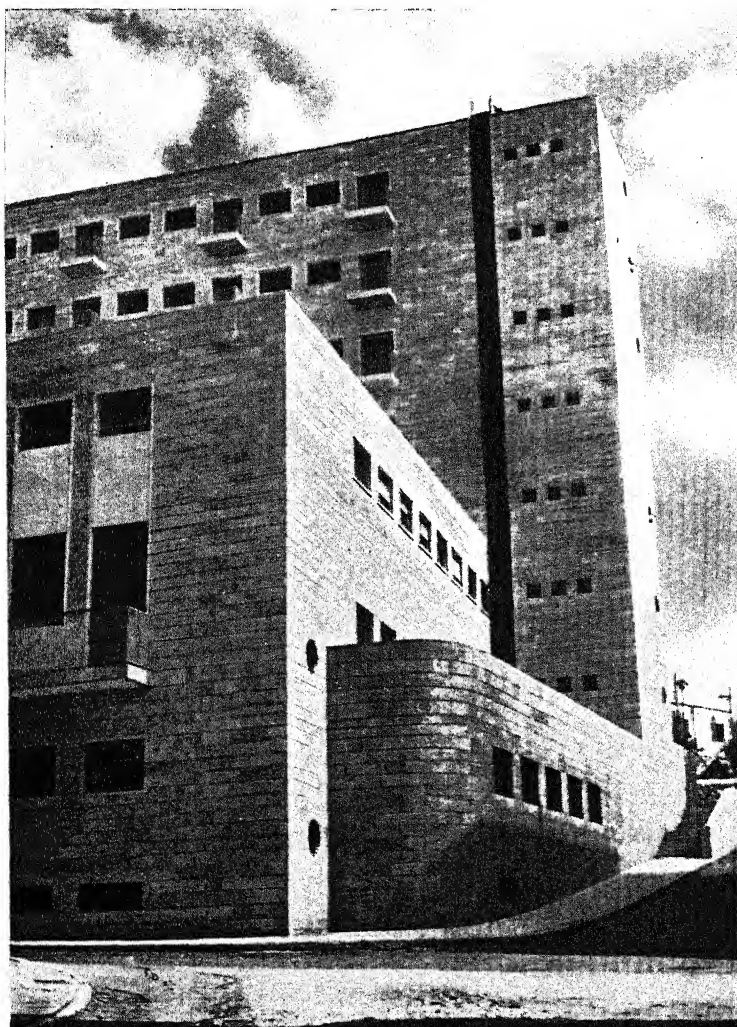
4. But could the Bank altogether have any policy of importance so long as currency would remain in the hands of the Currency Board? Where would it take the means to rediscount or to enter the market through the purchase of securities? And where are the bills and securities which it would be proper for a Central Bank to acquire?

A gradual extension of the powers of the Currency Board to invest its means in the country would probably meet the purpose to a much greater extent. A careful reconsideration of the whole somewhat antiquated Currency Board system seems overdue.

#### The Future.

Up to this point sources and forms of credit have been dealt with which, with few exceptions, relate to the fructification of such funds as were provided by the country's own economy. If Palestine is to continue on its present lines, it will, on the whole, be able to

perfect its credit system on the existing basis. A very different situation, however, will arise if the Zionist plans materialize and if a mass immigration takes place and is continued during a number of years. Such an immigration will require huge capital means. These funds are not available in the country and cannot, therefore, be provided by it. It will be necessary for the United Nations, if they recognize the realization of such a Zionist programme as a political necessity, to provide, or to assist in providing, the capital required for the purpose. A discussion of the form which this effort might take lies, however, outside the scope of the present article.



Back view of Anglo-Palestine Bank

*Photo Keren Hayesod*



### Private and Public Investment in the Jewish National Home

The provision of capital is one of the most difficult problems confronting colonisation and colonial countries. Investment in a colony must, as a rule, be very profitable, if it is to attract capital; high interest charges and dividends payable to investors abroad constitute a heavy drain on the country's resources. Therefore, any development depending on investment of foreign capital and involving the remittance of interest charges abroad, has grave disadvantages whether the foreign investment is in the form of Government loans, or private commercial credits. Palestine's development has, however, proceeded on different lines. Its capital supply has been obtained without incurring the heavy obligations of high interest charges to be paid to overseas capital markets. The advantage which Palestine thus enjoyed was due to the exceptional conditions of the Jewish people in the countries of Central and Eastern Europe. The precarious position in which most Jews found themselves in these lands, coupled with other factors, has ensured for Palestine a plentiful supply of capital. These funds were imported and invested by immigrants, the returns remaining within the country.\*

Another problem to be considered in connection with the supply of capital is that of its structure and nature. In every colonisation venture the choice between development by state and public funds or by private enterprise is all important.

\* The *Review* of the Midland Bank comments as follows: "Other parts of the world have been developed principally by the pioneering labour of persons of little or no wealth, equipped with capital provided by a totally different body of people. The result has been that year by year the developing country has had to provide, out of its own surplus or by fresh borrowing, a growing amount of funds abroad for interest on its external debts. In many countries the machinery has broken under the strain, and the sums invested have proved in the long run to have been largely lost, or at any rate devoid of net yield. In Palestine, by contrast, the settlers have brought with them the great bulk of the funds required for development, so that a relatively small obligation remains to be remitted abroad for interest. Thus, while many millions of capital have been introduced into Palestine from other countries, her external debt probably does not exceed a few millions. Hence 'payment difficulties' are far less likely to arise than under the more usual system of development."

Out of a total of LP 100-120 million invested by the Jews in Palestine, about LP 20-25 million were derived from public and semi-public funds requiring, if any, only negligible commercial returns.

These 'fonds perdus' have been devoted to the elementary tasks of colonisation, such as drainage of swamps, land improvement, industrial and agricultural experiment and health services.

The controversy as to whether development should be carried out by public or private funds was resolved by applying different methods at various times.

In the first stages of development a country is not an attractive field for private investors. The private investor is interested in safe returns and will hesitate to engage in enterprises which, although of cardinal importance to the economy as a whole, involve a somewhat large element of risk. Whole branches of economy, such as mixed farming, purchase of land at uneconomic prices, etc. are of fundamental importance to the reconstruction of the National Home and development of Jewish economy in Palestine. They, however, can hardly be considered as a lucrative investment from the point of view of the private businessman. Here is the gap where national capital must step in. Similar tasks are to be discharged by national capital in industry. For the promotion of new industries, the prospects of which are uncertain, and the pioneering stage of development of such industries by trial and error, national capital is indispensable. The task of creating preliminary conditions necessary for economic absorption falls, therefore, upon public and semi-public funds.

Palestine is no exception to this rule and the table overleaf reflects the relation between immigration and the expenditure of the two most important public funds of Palestine.

The conclusions to be drawn from these data—if the war period with its exceptional conditions is, as it should be, disregarded—are that in periods of high immigration and boom development the quota of public capital *per capita*

of immigrant is greatly reduced, because the mechanism of absorption with all its dynamic forces of co-migration is put into motion. The collection of funds cannot be brought into relation with the economic situation in the country. But whatever the amounts available, immigration is so large that the *per capita* amount of public capital is comparatively small in such periods.

Year	Number of Jewish Immigrants†	National Funds Collected in LP			Year
		Total	Per head		
1922	7,844	492,000	62.7		1921/22
1923	7,421	594,000	80.0		1922/23
1924	12,856	639,000	49.7		1923/24
1933	30,327	478,000	15.8		1932/33
1934	42,359	670,000	15.8		1933/34
1935	61,854	732,000	11.8		1934/35
1936	29,727	977,000	32.9		1935/36
1937	10,536	1,230,000	116.7		1936/37
1938	12,868	1,315,000	102.2		1937/38
1939	16,405	1,758,000	107.2		1938/39
1940	4,547	1,706,000	375.2		1939/40
1941	3,647	1,731,000	474.6		1940/41
1942	2,194	1,873,000	853.7		1941/42
1943	18,507	2,855,000	335.6		1942/43
1944	14,464	4,502,000	311.3		1943/44

In the 'twenties, public capital established the conditions for the extensive, almost unprecedented development in the 'thirties. In this first period no private capital was available for the work of development. A similar situation may develop at the present juncture. The new immigration will, in the greater part, be devoid of capital, even partly destitute. With the expansion of immigration to be equipped by capital for its absorption, the importance of public and semi-public capital should increase in the near future. Already a shift in the composition of Jewish capital import into Palestine can be detected. Whilst in the years 1935-39, the share of public and semi-public capital in the total investment amounted to an average of 13

per cent. a year, this share increased to 35 per cent. in the years 1940-44.

Some saving in future investments for the absorption of new immigration may be effected by the following three factors:

- (a) Experience gained. Previously considerable amounts were lost by experimenting in various branches of the economy and by uneconomic organization until a higher rate of efficiency was reached.
- (b) Fuller use of the already existing productive machinery which was only partly utilized in the pre-war period.
- (c) Greater facilities of absorption in an existent economy with a definite social pattern.

On the other hand, the cost might be greatly increased by the higher price level anticipated after the war and by the rapidity of absorption within a short period of time. The need of physical and psychological rehabilitation of refugees should also increase the cost of absorption.

Public capital thus plays a decisive role both in the preliminary period of preparation and in the creation of conditions for such a development. Moreover, during the slump it serves to 'iron out' the too violent fluctuations of booms and depressions, and to facilitate the task of readjustment and adaptation to changed conditions. In this period, public capital paves the way for the absorption of the 'labour surplus.' This is revealed in the ebb of economic activity which was previously stimulated by import of capital and immigration. It is then that the dynamic sector of the economy shrinks and the whole body economic, for a time, is forced to be sustained by current economic activity.

The general net income of the Keren Hayesod (Palestine Foundation Fund) from contributions received during the last 25 years (up to the end of September, 1945) amounted to £14,532,000, of which £13,055,000 represents regular income and £1,477,000 contributions earmarked for special purposes.

American donations to the Keren Hayesod until 1939 (i.e. the outbreak of war) totalled £7,356,000, and a further sum of £7,176,000 was received after the outbreak of war - October, 1939 to September, 1945, of which £2,340,000 was received in 5705. The amount received from America during the Jewish year 5705 totalled

† (Midland Bank *Monthly Review*, November/December, 1935, London, p. 7) The number of immigrants are reckoned according to the calendar year, while the funds collected are reckoned according to the Jewish year ending September 30th. But this difference is of small significance. Characteristic years have been chosen.

£1,561,000, or 66·7 per cent. of the total income from contributions. Palestine's share in the income of Keren Hayesod during the same period totalled 7 per cent. as against 2·3 per cent. at the outbreak of war.

Apart from the Keren Hayesod income from contributions, the receipts of this Fund and of the Jewish Agency for the period of the last 25 years derived from services, collections, participation, etc., were £5,419,000, of which £3,751,000 accrued during the period 5700–5705, roughly corresponding to 1940–1945. A substantial part of these receipts was represented by transfers from the recruitment and rescue fund which totalled £1,174,000 (of which £622,000 was spent on recruitment activities, and £552,000 on rescue work) up to the end of 5705.

Thus, the total income of the Keren Hayesod and Jewish Agency from all sources during these five years amounted to £19,950,000 (£9,023,000 of this amount was received up to the end of 1939 and the balance in the last six years).

During the last 25 years, the expenditure and investment of the Keren Hayesod and the Jewish Agency in the various branches of their activities (exclusive of the expenditure on organisation and propaganda of the Keren Hayesod Head Office), totalled £19,884,000. This amount does not include the financial obligations contracted two years ago, in respect of housing, agricultural settlement and industrial development, amounting to £492,000.

The amount of £19,884,000 can be divided up into the following items:

	To the end of 5699 (September 1939)		5700–5705 (approx.) 1940–1945		Total	
	In Palestine Pounds.	%	In Palestine Pounds.	%	In Palestine Pounds.	%
<i>(a) Immigration and Settlement :</i>						
1. Immigration and Training ; Aid for Refugees	1,069,000	12·2	2,521,000	22 6	3,590,000	18 1
2. Agricultural Settlements	2,723,000	31·2	3,194,000	28 6	5,917,000	29·7
3. Work and Housing	894,000	10·2	1,111,000	10·0	2,005,000	10 1
4. Commerce, Industry and In- vestments	681,000	7·8	693,000	6 2	1,374,000	6·9
Total	5,367,000	61·4	7,519,000	67 4	12,586,000	64·8
<i>(b) Public Services :</i>						
5. Education and Culture	1,656,000	19·0	619,000	5·6	2,275,000	11·5
6. National Organization and Security	758,000	8·7	2,585,000	23·2	3,343,000	16·8
7. Social Welfare and Health	375,000	4·3	52,000	0·5	447,000	2·1
8. General Administration, Pay- ment of Interest, etc.	581,000	6·6	372,000	3 3	953,000	4·8
Total	3,370,000	38·6	3,628,000	32·6	6,998,000	35 2
Grand Total	8,737,000	100·0	11,147,000	100·0	19,884,000	100·0

The task of Jewish national capital in Palestine is similar to that discharged by Government budgets in other countries. The fiscal system successfully introduced in Sweden and applied in many other countries is that of a 'cyclical budget,' i.e. a budget not balanced within one year, but within a whole cycle of economic prosperity and depression, the surpluses accumulated in the period of prosperity being used in periods of depression, with public capital stepping in in times of crisis when private capital is reluctant to invest in new enterprise.

Another indication of how preliminary investment of public capital creates the conditions necessary for the commercial raising of funds is the growth of the local security market. In the initial period of colonisation, 'indirect' and impersonal investment through the mechanism of a security market is an almost unknown phenomenon. In the later stages the volume of capital so invested is continually on the increase. This is shown by the following figures:

Issue of Securities in Palestine\*

Up to 1932	3,510,000
1932 to 1939	8,576,000
Total, end 1939	12,086,000

This development is in some respects similar to that of other countries. The following view on the respective merits of the development of a country by public or by private funds is put forward†:

"The historical situation of the community demands careful investigation before final

conclusions may be reached as to the relative merits of two possible methods of operation. It may well be that, at certain stages in the history of a growing and pioneer country, the urgency of developmental operations may be of greater moment than the comparative financial advantage of alternative modes, and at a later and more settled stage of its evolution, economic considerations as to gain or loss become of greater importance."

Thus, to a certain extent, public capital acts as the "ignition spark" to private initiative and investment.\*

This task of an 'ignition spark' is perhaps the most important one. New economic forces are released by investment and pioneering activity of public and semi-public capital. The impact of these new economic forces is incomparably greater than the ignition spark itself. Thus employment facilities are created in an expanding dynamic economy in which public capital and private enterprise are dovetailed and interdependent.

\* The experience of Palestine amply bears out the contention of the Technical Conference of Experts of the International Labour Office —

"It may be concluded that a revival of settlement movements, and particularly of migration for settlement, which official services and settlement organizations of the social type are at present not sufficiently developed to bring about, cannot be expected to result from the action of commercial and speculative settlement bodies. Such a revival can be obtained only in the measure in which it is found possible to develop and multiply organizations prepared to invest the necessary capital, granting sufficiently long periods for repayment, and able to create in the settler's mind the certainty that every effort will be made to ensure this success. Through the creation of organizations of this kind, their development where they already exist, the provision of the capital that they need, and the financing of settlement work in general, a new impetus may be given to settlement and migration movements."

"(Technical and Financial International Co-operation with regard to Migration for Settlement." 1938, p. 32)

\* *Economic Survey of Palestine*, by D. Horowitz and R. Hinden, 1938, p. 180.

† *The People of Australia*, 1935, p. 25.

### Agriculture of Palestine\*

In spite of its small size Palestine is geographically, climatologically and therefore agriculturally, very complex. Its most important feature is the block of hill country running north and south from Jerusalem, and extending eastwards to the Jordan valley. This is surrounded by plains and lower undulating country. Agriculturally the chief of these is the coastal plain bordering the Mediterranean and stretching northwards to Mount Carmel, where the hills come nearest the sea. Another plain borders the northern side of the hills; the part by the coast is called the Acre-Haifa plain, and a larger plain farther eastwards, and running southward into the hills, is called the "Emek" ("the Valley") or in the official documents Esdraelon. The plain of Esdraelon links on to the Jordan valley, the eastern boundary of Palestine, by the valley of Jezreel and the small but important plain of Beisan. Then running north to south is the Jordan valley which widens south of Tiberias and again further south, but is in the main narrow. At Tiberias it is already 700 ft. below sea level and it drops continuously so that at the Dead Sea it is no less than 1,300 ft. below sea level. Westwards from the Dead Sea is a great block of undulating country which includes the Negev and stretches as far as the Coastal Plain and to the Palestinian southern boundary.

The Jordan is mainly fed by the snows and rainfall of Mount Hermon and its neighbours; there are several lakes in its northern part: Merom, Huleh, Tiberias being the chief; it flows into the Dead Sea which, however, has no outlet, and the temperature being high the water simply evaporates. From the agricultural point of view this is all sheer waste; unfortunately the Jordan valley is so narrow that it could never have become the centre of a great civilisation based on irrigation as happened in the Nile valley and in Mesopotamia; had the valley been wider Palestine would have had a very different history.

\* The statistics quoted are from the Statistical Abstract of Palestine, 1943, and the Jewish Agency, to whom my best thanks are due.

The rain comes from the Mediterranean and is caught on the central block of hills which run to some 2,000 to 3,000 ft. in height. Here it finds its way down the valleys into the surrounding plains, but the streams do not all reach the sea; a number of them get lost on the plains and become marshes, which are among the most characteristic features of the plains.

The rainfall is not unduly low: over a good part of the northern country it is about 20 to 25 inches per annum, but unfortunately for agriculture it is not evenly distributed; it comes only in the winter months from November to April; the rest of the year is practically rainless. It is the highest in the northwest of the country and falls off to the south, slowly at first but more rapidly afterwards. The central part of the Coastal Plain, so important for citrus, has about 22 inches annually. Gaza has about 15 and Beersheba only 9 inches. The rainfall diminishes in going eastwards: Esdraelon has 20 inches, Tiberias has 18, Jericho 6 and the north end of the Dead Sea less than 4 inches.

About half of Palestine, southwards of a line drawn from Gaza to Jericho, receives so little rain as to be almost or quite a desert with only sporadic nomad sowings of grain. Palestinian agriculture is practically confined to half the country, lying north of this line.

The temperature conditions are also governed by the central block of hills and its proximity to the Mediterranean. The hills have a cooling effect: the mean July temperature of Jerusalem is about 23° C., the mean January temperature is about 7° C.; for Jericho the figures are about 31° C. and 14° C. respectively; the Mediterranean makes the climate of the Coastal Plain more equable: the mean July and January temperatures at Tel Aviv are 26.5° C. and 12.5° C. respectively. The spring weather is apt to be somewhat spoiled by a hot wind carrying dust and sand from the south, called the Khamsin.

Most of the hill block is cretaceous and the plains are diluvial, but the desert country to the south is largely windblown loess. In prehistoric times the hills were probably



*Photo GIDAL*

Pattern of soil after rainfall (Negev)



covered with trees or bushes, but these gradually got cleared and nomadic tribes acquired certain grazing rights. The process was much intensified under the Turkish régime and in consequence the hills are now almost bare except where they have been replanted or brought under cultivation. In the eastern and southeastern regions the lowness of the rainfall has retarded the establishment of a permanent vegetation cover, and grazing has destroyed whatever was starting into growth. The baking sun reduces the soil to dust, and the rain, as usual in arid regions, is apt to be torrential when it comes; so that soil erosion both by wind and rain is widespread in the dry southern and southeastern regions. This is a real tragedy, as afforestation once started would stop the process and permit of the re-establishing of a vegetation cover, the remaking of the soil and better conservation of the water supply. Some afforestation has been started, but grazing makes difficulties. The largest forest blocks are in the north: Jenin (229,522 d.), Haifa (124,721 d.), Acre (100,073 d.), Nazareth (85,551 d.). The central and western hill country owing to its higher rainfall has long been much more successfully utilised than the eastern part, and from time immemorial has produced grain, oil, wine and figs as well as much grazing; these still remain the chief products along with apricots and vegetables. The hills are closely terraced to stop erosion and to hold the surface water.

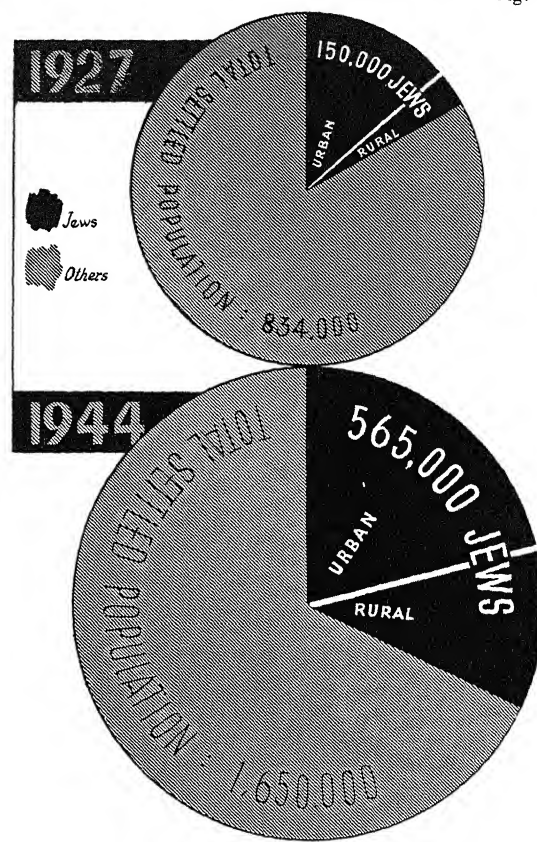
#### General Pattern of Palestinian Agriculture.

The total land area of Palestine is 26.3 million dunams, but of this only about 7.6 million dunams are cropped. The Jewish colonists in 1944 cropped 0.73 million dunams, rather less than 10 per cent. of the whole. As the Jewish population was then estimated at 565,000 out of a total of about 1.7 millions, i.e., about 33 per cent., it is obvious that the Jewish share of the cultivated land is much less than corresponds with their total numbers.\* (Fig. 1)

The physical conditions of Palestine are moderately well suited to wheat and barley, two very easy crops to grow. These therefore form the staple of the Arab cultivation, covering about

\* There is, however, a further million dunams of land in Jewish possession.

Fig. 1



60 per cent. of the Arab cultivated land. They are, however, not very lucrative crops and are much less grown by the Jews; in peace-time they formed about 24 per cent of their cultivated land. The war however made a great difference and by 1944, when there was a great pressure for growing cereals, the percentage amounted to 58 per cent. (Fig. 2)

Both Arabs and Jews grow much fruit; the Arabs concentrate on olives, grapes, figs, melons and citrus; their planting amounts to 1.13 million dunams, i.e. 16.3 per cent. of the total cropped land against 34.7 per cent. on the Jewish land.

These figures illustrate the relative intensity of Jewish and Arab farming. Further evidence is shown in the yield of wheat and of milk per cow; the Jewish figures being in each case more than double those of the Arabs. The Jewish farming is, however, practically all

	Total area cropped	Wheat and barley	Fruit plantations	Wheat and barley percentage of cropped area	Fruit plantations percentage of cropped area
	Million ds.	Million ds.	Million ds.		
Arab land	6.87	4.1	1.13	60%	16%
Jewish land	0.52	0.12	0.18	24%	34.7%

These figures are for 1936 and show the peace time pattern of Jewish and Arab agriculture

carried out in the plains, while much of the Arab farming is in the hills. Under similar conditions, e.g. in the orange groves of the Plain of Sharon, there is much less difference between Jews and Arabs, but the orchardists represent the élite of Arab cultivators. While the Arab yields are low, their cost of production is also low.

#### The Crops of Palestine.

The cropping is determined by the fact that the rainfall is confined to the winter months, October to April, and therefore only during this period is sowing possible, so that the crops are divided into winter crops sown at the beginning of the winter rain, and summer crops sown just before the end. These summer crops are therefore very dependent on the late rain.

hence the Old Testament reference to the 'latter rains' and the Arab name 'the rain of gold.' The simplest arrangement is to alternate summer and winter crops, but an immediate follow-on is impracticable on the same land.

The sequence in the Jewish colonies is:

First year: January to March: continuing winter fallow.

March to September: summer crop; hoed roots ('tuberroots') and forage crops,

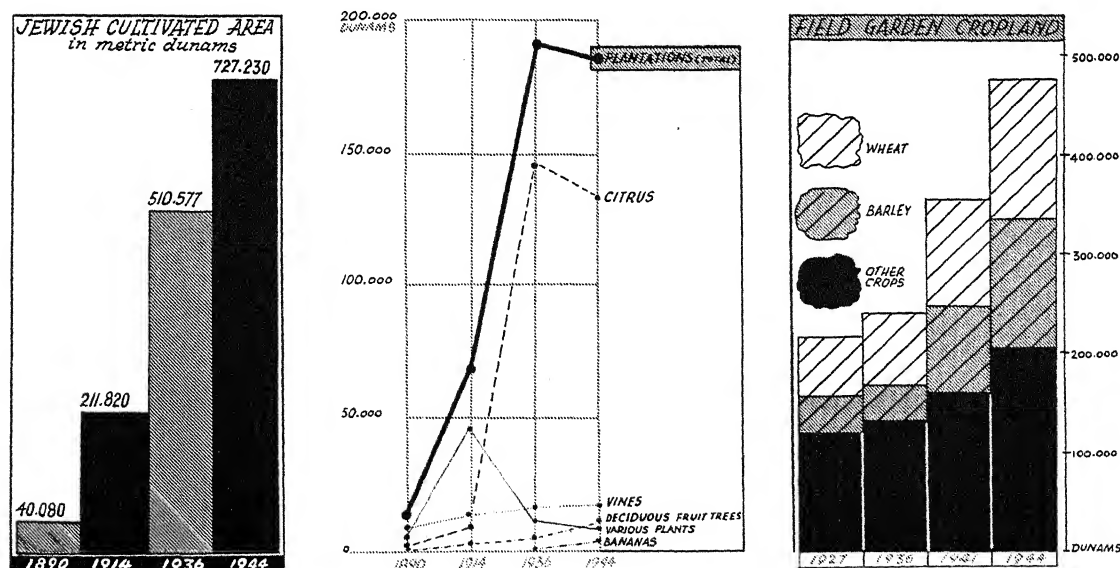
November or later: sow winter crop (wheat or barley).

Second year: June: harvest corn,

July to December: fallow.

On this sequence half of the sown land is in cereals and this usually happens over considerable areas.

Fig. 2



Where it is possible, however, a three-course rotation is much better:

First year : January: continue winter fallow,  
March to September: hoed roots  
and forage crops,  
October to November: sow  
vetches.

Second year : March-April: make vetch hay,  
April to September: fallow,  
October-November: sow winter  
crop (wheat or barley).

Third year : June-July: harvest,  
July to December: fallow.

More elaborate rotations are being introduced bringing in green manure crops and leguminous crops, but these are not yet widely adopted.

The Arabs do not crop as closely and so do not have half their land in summer crops. For Palestine as a whole the winter crops occupy three times the area of summer crops, so that there is much more fallow than on the Jewish land. These fallows are uncultivated and afford a certain amount of poor grazing.

#### The Winter Field Crops (1) *Wheat*

Of all the field crops of Palestine wheat is the most important both in area, quantity of produce and value. The Arab system of production is very simple; the cultivation, however, does not keep down weeds and much hand weeding is done by the women, the weeds being given to the animals to eat. Arab yields are very low: dividing the total produce by the total acreage, we get the low figure of 4 or 5 cwt. per acre only. But the cost of production is low\*.

For the Jewish settlers results of this order would be quite inadequate, and Jewish experts have made many efforts to raise the yield. Better implements that ploughed deeper than the nail plough have not clearly given higher yields, but the tractor has saved human labour and speeded up operations. Search has been made for new varieties better suited to the conditions and yielding larger crops of more desirable grain than the old local ones, and some promising sorts have been obtained by the use of parent material from Morocco, Australia, etc. The soils of Palestine have through long neglect

\* The average yield for Great Britain is 17.8 cwt. per acre.

become very exhausted and numerous fertilizer experiments have shown that nitrogenous and phosphatic manures increase the yield of wheat, provided always that the water supply is sufficient. The returns are less than in Great Britain, 1 cwt. of fertilizer on the average giving only about 1 cwt. increase of grain.

The most important factor under the cultivator's control for increasing the yield of wheat is the previous treatment of the land: a bare fallow is best in regions of low rainfall, but where water can be spared for irrigation a green manure crop or fodder crop is better for the land.

Wheat is grown almost entirely on unirrigated land and its yield is very dependent on the rainfall. The earlier Jewish colonists got about 60 kg. per d. (5 cwt. per acre); in recent years they have got 120 or more (10 cwt. per acre).\* Arab yields are less, only about 60 kg. per d. The crop is easy to grow but troubles may always supervene. The Khamsin (p. 116) may do serious damage in drying up the ears before they are properly formed; rust is always likely to appear in its season; locusts give trouble and so do birds. The local varieties usually ripen before much harm is done; this means a lower yield in good years but a safer yield on the whole and for this reason they have survived.

#### (2) *Barley*

In Great Britain barley is a spring crop, but in Palestine it is usually taken as a winter crop. It tolerates dry conditions even better than wheat and so there is a tendency for it to become more important as the rainfall decreases:

Production in metric tons, 1942.

District	Rainfall ins. p.a.	Wheat m. tons.	Barley m. tons.
Lydda	22	16,000	7,040
Gaza	15	12,360	9,360
Beersheba	9	10,000	50,000

The grain can be used either for brewing or for feeding to animals. For all Palestine the area under wheat and barley in 1941-42 was 4 million ds. (2 million of each); the Jewish colonists have 204,000.

(3) *Leguminous Winter Crops*

These are grown for grain but the straw is also valuable as fodder; they are in order of importance: kersenneh, used for animal food;

*Oil seeds.* These include sesame and sunflowers; earthnuts, according to Volcani, could also be grown. The chief, however, is sesame, mainly grown by the Arabs. The districts of Jenin, Jaffa-Ramle, Nazareth between them produce

	Area, dunams		Produce, m. tons		Chief Districts
	1941	1942	1941	1942	
Kersenneh	202,669	170,093	5,726	7,850	Hebron, Nablus, Nazareth, Jenin, Jaffa, Ramle
Lentils	130,603	96,045	3,085	4,022	Hebron, Nablus, Gaza, Nazareth, Safad
Beans	69,870	45,588	2,161	2,497	Nablus, Safad, Nazareth, Tulkarm
Chick-peas	31,058	25,831	1,432	1,395	Haifa, Tiberias, Nablus
	434,200	337,557			

Percentage of all land in field crops: 1941, 6.9%; 1942, 5.7%.

lentils for human food; beans for human food; and chick-peas for animal food. The acreages and estimated production for all Palestine for 1941 and 1942 are as shown in the table above.

Most of these are grown by the Arabs; the Jewish colonists had only 21,830 dunams under 'legumes' (which includes any or all of these crops). This is only 4 per cent. of the half million dunams they cultivate in field crops. The Jewish areas in the above list were at Tiberias (chick-peas) and Haifa (beans); the rest are all Arab.

about three-quarters of the total output. There is a smaller production from Gaza, Haifa, Acre and Tulkarm. The Jewish acreage is only small and the crop is used as fodder (see p. 126), the chief regions being Esdraelon and the Jordan Valley. The areas and output of dura and sesame have been, for all Palestine:

	Area, dunams.		Produce, m. tons.	
	1941	1942	1941	1942
Dura	957,354	1,060,233	65,494	57,965
Sesame	222,267	194,205	7,467	6,214

Summer Field Crops (A) *Usually Non-irrigated*

*Dura.* This is a millet of African origin, brought in by the Arabs and cultivated mainly by them. Its production has been increasing in recent years. A small output comes from the Tiberias settlements, but otherwise the Jewish colonists grow very little. It occupied in 1941-42 about 1 million dunams and yielded about 5 cwt. grain per acre in addition to considerable quantities of stalk and leaf for rough fodder. Its chief regions of production are Gaza and Beersheba (one-third of the total produce is raised here), Jaffa-Ramle, Hebron, Tulkarm, Jenin, Haifa, Safad.

(B) *Mainly Irrigated*

(1) *Vegetables.* There has been a remarkable expansion of vegetable growing by the colonists in recent years. The area in 1941-42 was nearly 27,000 d., mostly irrigated, being three times what it was in 1936. This is a wholly beneficial development and it has occurred in all the plains, in the Jordan Valley and in Upper Galilee. The Arabs also have a great area under vegetables and for all Palestine the total is about 215,000 d. with a production of about 190,000 metric tons.

Tomatoes are the most extensively grown, followed by onions and garlic and by cucumbers.

The acreage under potatoes is not large, but there is a fair-sized area under cabbage, cauliflower and egg-plant and a variety of other vegetables, which in the aggregate amount to some 56,000 d.

(2) *Fodder crops.* These are dealt with under live-stock.

(3) *Fruits.* Melons: Melons rank with the field crops because they are grown like vegetables and not in plantations. The total Palestinian area was in 1941, 117,282 d., mostly grown by Arabs. They grow on sandy soil and the area cultivated by the Jews has decreased as the orange groves have extended.

(C) Plantation Fruits: *Non-irrigated*

(1) *Olives.* The olive is one of the most typical trees of Palestine; it is probably a native of Syria but has been cultivated since very early times. It now occupies an area of 600,000 dunams out of a total of one million dunams of all non-citrus fruits. It has the great advantage of drought-resistance and it grows well on the hills; further the trees attain a great age. Few Palestinian sights are more characteristic than the old gnarled olive tree with a collar of soil around it, held up by a stone wall to protect it from soil erosion.

In spite of its associations, the modern Jewish colonists grow but few olive trees: only 5,229 dunams out of 37,000 dunams of all non-citrus fruits; they are grown chiefly in Lower Galilee and Shomron, with smaller areas in Upper Galilee, Shephela and the Plain of Esdraelon.

(2) *Figs.* Figs grow well in the hills and do not need irrigation. The total acreage is about 105,000 dunams, but like olives figs are now grown mainly by the Arabs and no important acreage is cultivated by the Jews.

(3) *Grapes.* This is the only one of the ancient fruits of Palestine that has appealed to the Jewish settlers. Of the total area grown, 172,000 dunams, the Jewish colonists have 18,400 dunams, 13,400 without irrigation, mostly (8,700 dunams) in the Shomron zone. Shephela has a considerable area (2,900 dunams), as also has the Plain of Esdraelon (1,844 dunams), where about one-third of the acreage is irrigated. Another important region is the Jezreel valley where, however, all the vines are

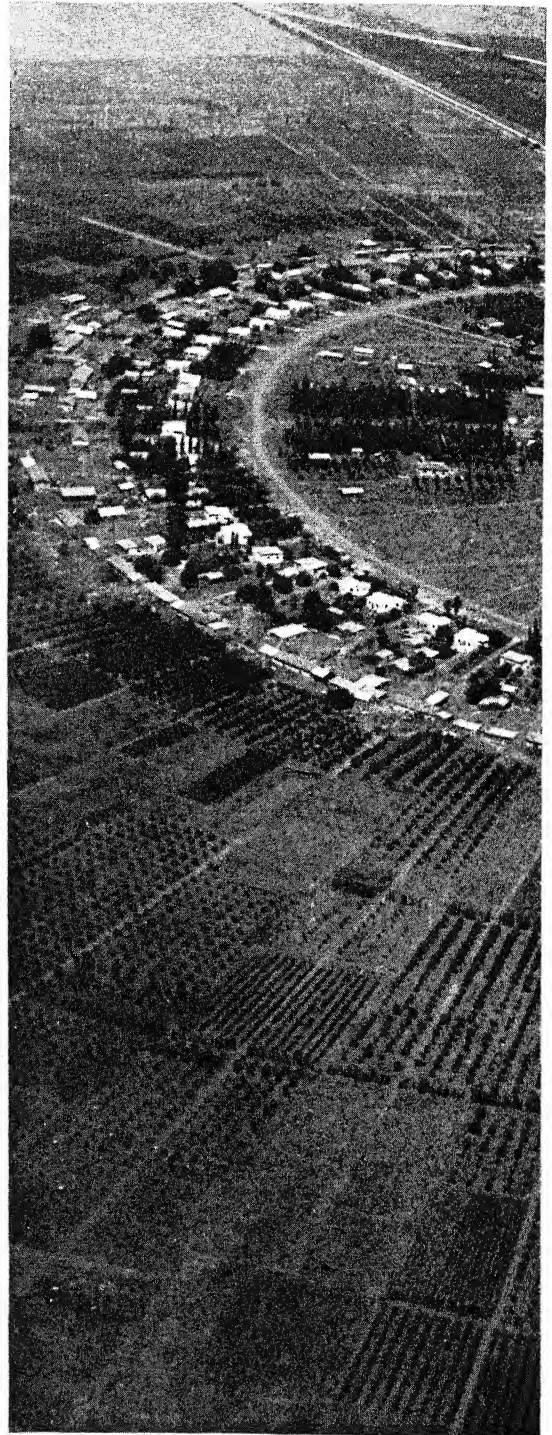


Photo PALESTINE HOUSE





Settlement at Nahalal



irrigated (972 dunams); there are smaller areas in Southern Sharon and in Upper Galilee, in both cases mostly irrigated, North Sharon and the Jordan Valley (374 dunams, all irrigated). An important wine-making industry centres round Rishon le Zion, and experimental work is done at the school of Mikveh Israel. The wine is light and pleasant, but it does not keep well and produces no great vintages; the demand is only limited. Raisin production has been attempted as an alternative and also the production of fresh table grapes; after the war it is hoped there will be room for all three. (4) *Bananas*. Of the 5,743 dunams grown in Palestine the Jewish share is almost exactly half, viz. 2,809. The crop is mainly confined to the Jordan Valley (2,261 dunams), the remainder being divided between the Beisan (Beth Shan) Plain and the Southern Sharon region. In the latter it is important because it will grow on heavy soil and so gives an alternative to the cereal and fodder crops which would otherwise be the only possibilities.

(5) *Almonds*. Almonds, formerly important in Sharon as a partner of the vine, have almost ceased to interest the Jewish cultivator.

#### Deciduous Fruits: Mostly Irrigated

The total area of deciduous fruit in Palestine is 37,679 dunams, of which the Jewish share is 8,078, three-quarters being irrigated. The chief regions are the Plain of Esdraelon where over 3,000 dunams are grown and over 2,000 are irrigated, half are apples; Upper Galilee has 1,100 dunams, 670 being irrigated, and again half are apples; on the Coastal Plain, there are 2,232 dunams, all irrigated.

The number of dunams in the different fruits are:

	All Palestine.	Jewish Area
Apples	15,200	3,661
Plums	3,918	1,437
Pears	2,150	823
Others (except Apricots)	16,411	2,157
Total	37,679	8,078

A wide range of fruits, subtropical and others,

is included in the 2,157 dunams of unspecified sorts.

*Apricots* are the most popular of the deciduous fruits with the Arabs, the total area being 22,240 dunams, but the Jewish share is comparatively small.

#### Citrus Fruits: Entirely Irrigated

Citrus fruits have been grown in Palestine for many years, but it was not till the Jewish colonies began to expand that the area became at all considerable. The citrus industry is a great triumph for Jewish technical skill and organization, both in production and in marketing, and it has added greatly to the agricultural wealth of the community.

The total area before the war was almost 300,000 dunams, of which the Jews owned 155,000 dunams. By far the largest proportion (Fig. 3) was in the Shephela and in North and

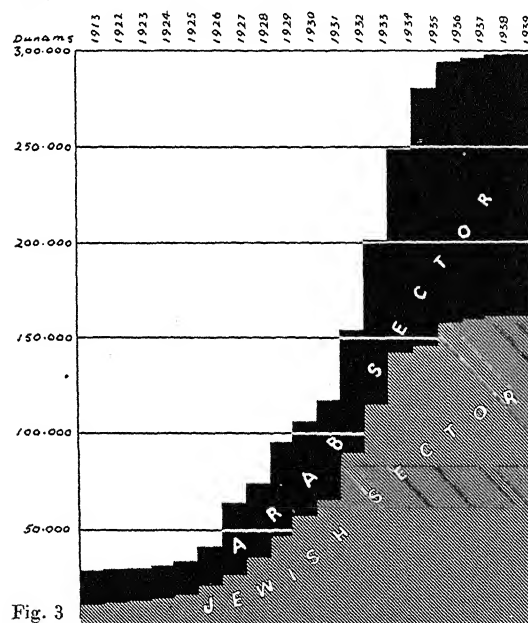


Fig. 3

South Sharon; there is also a large area in the Jordan Valley.

One of the great merits of citrus trees is that they prefer the sandy soils, which are unsuitable for ordinary agricultural crops except melons. So the soils which in old days were of small repute have now become the most desired of all those on the Plain.

The irrigation is of 'basin' type and is done from wells. The details of treatment vary somewhat with the conditions. A usual watering for a tree ten years or older is about one cubic metre of water every ten days. Gummosis may set in if the water lies round the tree trunk, and so it has a protecting collar of earth.

Four years after planting the trees begin to bear and before very long their branches are touching. Much cultivation is needed to keep down weeds and this has to be done by hand with a large adze-shaped tool. The work is made the more arduous because owing to the overhanging branches it has to be done stooping down.

Fortunately the growers are spared two troubles that often affect irrigated land. Owing to the porous nature of the soil the water soaks away without the need for artificial drainage. There is also no trouble with alkali.

Citrus-growing requires a high degree of intelligent industry; the trees need constant watching, they are liable to various diseases and pests, including Black Scale, which can be controlled by fumigation. Manuring also needs care: organic manure can be purchased from the Arabs and the proper artificial fertilizers must also be used.

But if the cultivation calls for an effort on the part of the cultivator he has his reward which is shared by the community. No crop gives better returns or requires more labour per 100 dunams and none is more attractive. In the spring when the blossom is out the scent is delicious and in the autumn the golden fruit embedded in its bright green foliage makes a picture of unforgettable beauty. Then in November begins the export season with all the excitement involved, while care for the trees always absorbs the cultivator's thoughts. But the industry is essentially one for peace-time: in war the export ceases and the crop has to be put to other and less lucrative uses.

#### Live Stock.

Before the war sheep and goats constituted about two-thirds of the large live stock population, the goats unfortunately outnumbering the sheep. They are very destructive of trees and surface vegetation and prime factors in causing

soil erosion. They are, however, mostly owned by the Arabs. The numbers vary from year to year: the annual enumeration for the whole country ceased in 1934 (except for 1937); up till that time the sheep had varied from 250,000 to 300,000, and the goats from 400,000 to 500,000. The Jewish settlers in 1942 owned 19,120 sheep and 12,455 goats and kids, about half being thoroughbred and half local breeds; the sheep were mainly in the Haifa, Beisan, Tiberias, Nazareth and Safad districts and the goats in the Jaffa, Haifa, Ramle and Tulkarm districts.

*Dairy Cattle.* For the Jews dairy cattle are much more important, partly because of the considerable demands of the towns which necessitate at present a large import of dairy produce; partly because dairying is practicable on the heavy soils which are unsuitable for citrus and indeed affords the most profitable use for them. Volcani states that a good cow can be kept on less than 10 dunams of non-irrigated land, and for only about 100 days between October and January will it be necessary to feed dry fodder; while on 10 dunams of irrigated land it is possible to keep three cows and they will have food all the year round. He instances farms of 150 dunams where seven cows are giving a yield of 18,000 litres of milk per annum (570 gallons per cow). Such results imply good management which, however, is obtained by the Jewish colonists.

Dairying has long been practised on some of the colonies on the Coastal Plain: Saxona, Wilhelma, Beit Lahim and at Mikveh. but in recent years it has much increased. The number of milch cows owned by the Jewish colonists had by 1943 exceeded 1,500, mostly pedigree or selected, without counting heifers and calves. The total production of milk for the year was nearly 13 million gallons. The chief dairying districts are Jaffa, Haifa, Nazareth, Ramle, Tulkarm, Beisan and Tiberias.

Estimates of yield are difficult to obtain, but Jewish experts put them at:—

Arab cow, 150 gallons: Syrian cow, 440 gallons; Pedigree cow, 770 gallons.

There is need for more dairy production and the work is well suited to the Jewish cultivator: the experience of Denmark and New Zealand

shows how good a standard of living can be attained on small dairy farms. But the cost of production in Palestine is too high. This was enquired into by the Empire Marketing Board in 1927. There were two chief reasons. The cost of raising calves was about double that of the successful countries because so much milk was fed to them. Skilful feeding with milk substitutes brought down the cost to about one half. Further, the cost of feeding the animals was high owing to the absence of grass and the scarcity of summer foods. Fodder crops, therefore, play an important part in the dairy industry.

#### Fodder Crops.

As it is essential to ensure an unbroken sequence of food for the animals it is necessary to grow several crops which between them will cover the whole year. They fall into two groups: the cultivated crops called by the Jewish culti-

vators, 'tuberoots,' and the hay and forage crops. The *tuberoots* include maize (62,000 dunams), dura (13,732 dunams), water melons, melons and pumpkins (6,000 dunams) and various others (1,857 dunams). These crops are commonly used for opening the rotation. In all they cover 83,744 dunams.

*Hay and forage crops* are chiefly vetches or vetch mixed with wheat, barley or havena, but they include also other leguminous crops made into hay. They are grown on about 64,000 dunams chiefly in the Emek, the valley of Jezreel and the Coastal Plain. The green fodder crops occupy 3,000 dunams in the same regions and also in Lower Galilee.

The sequence of cropping depends on the conditions, but specially whether the land is irrigated or not; two are given as examples.

#### i. *Non-irrigated Land.*

*Maize*, sown in April, cut green as wanted from June to August.

*Trifolium Alexandrinum* (berseem) sown in



Fruit settlement (mostly developed by Youth Aliyah graduates) in the Negev

April; first cutting in October or November, three or four cuttings till May.

*Pumpkins* can be grown to fill in the troublesome gap between the maize and the berseem.

*Vetches* made into hay and fed during late autumn and early winter.

#### ii. *Irrigated Land.*

The problem is simpler. The *maize* grows for a longer period and may last till the first berseem crop is ready.

*Fodder beets* can also be grown to fill up this gap.

Experiments have shown the great value of fertilizers for these fodder crops.

The Arabs grow little in the way of fodder crops, using hill grazing, stubble grazing, straw and weeds from the growing corn crops.

#### Poultry.

The production of eggs and poultry is very suited to small farmers and it has been expanding in recent years in Palestine. The largest numbers are found in the Jaffa, Tulkarm, Haifa, Ramle and Nazareth districts. There is still room for more production; only about 40 per cent of the Jewish consumption comes from the colonies, most of the rest has to be imported.

#### Honey.

This is an ancient Palestinian product. Wherever fruit is grown bees should be kept if only to ensure good pollination. The yield of honey may not always be good because drought may interfere with the flow of nectar.

#### The Agricultural Regions of Palestine.

We are now in a position to summarize the characteristics of the agricultural regions of Palestine. We shall confine ourselves to the regions of chief interest to the Jewish colonists. The Coastal Plain stands first in importance because of the large amount of citrus fruit grown there. The plain is of limestone origin and its soils vary from sand to heavy loams or clays. Fringing the coast is a strip of sand which unless fixed by grass and trees is capable

of doing damage by drifting inland and burying fertile soils. This is well seen at Caesarea. Reclamation is technically practicable but is hampered by the existence of Arab grazing rights.

Sand has also blocked the streams, especially in parts of the North, giving rise to malarial swamps which, however, can be reclaimed and converted into good agricultural land, provided again that grazing rights do not interfere.

The southern part, called *Shephela*, begins at Gaza and stretches up to Petah-Tiqva. It has 58,500 dunams of fruit, mostly irrigated citrus but some unirrigated grapes and some almonds; it has also 45,600 dunams of other crops. Of these 31,000 are non-irrigated in ordinary farm crops, half being cereals, about a quarter hay and forage, and the rest tuberoots with some legumes and a small area under oil crops. There is also much green forage, vegetables and nearly 3,000 dunams of fallow. The part north of Tel Aviv is the most populous.

North of this the plain is called *Sharon*; it is divided at Nathanya (on the coast due west of Tulkarm) into two parts, northern and southern, the southern being the richer. It has 28,600 dunams of fruit, nearly all irrigated citrus but with a sprinkling of others; it also has 6,300 dunams of vegetables and 2,600 dunams of green forage, both mostly irrigated. The area under farm crops is 30,000 dunams, of which 22,000 are non-irrigated; half is in hay and fodder and one-third in cereals. The northern part has only 17,800 dunams of fruit, again mostly irrigated citrus: it has nearly 3,000 dunams of vegetables and over 2,000 dunams of green forage, both mostly irrigated, but it has about the same area of farm crops as the southern part – 29,000 dunams – of which 23,000 are non-irrigated, divided up as in *Shephela*, half in cereals, a quarter in hay and forage crops and a quarter in tuberoots.

A smaller neighbouring district *Emek Hefer* (Ein Haoved to Hibath Zion) has also a somewhat similar distribution of its ordinary crops (11,400 dunams): it has in addition over 3,000 dunams of green forage, nearly 2,000 dunams of vegetables and 5,500 dunams of fruit, all irrigated and mostly citrus.

*Shomron* lies between Northern Sharon and Haifa, but its agriculture is less intensive. It

has more fallow and far more olives in spite of its smaller size, but less vegetables and green forage; it has, however, more legumes.

The pattern of agriculture in the Plain stands out clearly: citrus on the light soils where there is water; cereals and fodder crops where there is not. On the heavy soils vegetables and dairying where there is water; vines, cereals and fodder crops where there is not. The watered areas become less as one goes northwards and cereals become more prominent.

The Plain of *Esdraelon* has 119,130 dunams in Jewish cultivation. It has a different pattern of agriculture from the Coastal Plain. It has very little citrus and that is grapefruit rather than oranges. It has, however, apple trees and plums as well as grapes. But all the fruit (apart from melons) amounts only to 6,000 dunams of which 3,500 are irrigated. *Esdraelon* is much more a region of mixed farming. It has not a great deal of water, only about 8 per cent. of its cultivated land is irrigated (8,600 dunams) and of this two-thirds is in fruit and the rest in green forage. It has 96,650 dunams of ordinary non-irrigated crops and, as usual, half is cereals; the hay and forage amount only to 15,000 dunams but the tuberoos (unirrigated) to 30,100, the highest in any region. There are also 8,500 dunams of green forage, one-third of which is irrigated and 5,375 dunams of fallow.

The *Haifa-Acre* plain is much smaller (37,411 dunams in all, crops and fallows); it has a very similar type of agriculture except that it has less fruit.

The *Jezreel* valley has a special character with more fallow and a higher proportion of cereals than elsewhere. It has over 9,000 dunams of irrigated land of which 2,500 are in fruit, half in grapes and half in citrus other than oranges and grapefruit; 5,100 are in green forage and 1,500 in vegetables. Of its 46,800 dunams of unirrigated land no less than 12,400 is in fallow, this being the highest for any part of the Jewish areas. Of the remainder 33,300 is in ordinary crops, two-thirds being cereals.

*Beisan* has a similar pattern of agriculture, except that it is almost devoid of fruit.

*Lower Galilee* has a less intensive agriculture than the plain of *Esdraelon* but resembles it in having 50 per cent. of its ordinary cropped

non-irrigated land in cereals. It has proportionately less tuberoos, much less hay and forage, less fruit, but more legumes and much more fallow. Its distinctive feature is its large area of olives and of fallow land.

*Upper Galilee* on the other hand has more of the intensiveness of the Plains. It has more irrigated land, produces more deciduous fruit, especially apples and grapes and has more vegetables and green fodder.

*The Hills of Judaea.* The settlements are few and cover only a small area, but the interesting point is that they are there, and practising a very mixed farming, including deciduous fruit, grapes, vegetables, cereals, green forage and tuberoos, almost everything in fact except citrus. It will be interesting to see how far they can hold their own.

#### What of the Future?

It is never safe to attempt forecasts of the future of agriculture, but there are certain clearly defined trends in Palestine. The Jewish population in the cities grows faster than that in the country, so that in 1942 only 23.8 per cent were counted as rural; only about 56 per cent of these live by agriculture. This means that there is a large market in the cities for agricultural produce.

Mr. L. Samuel has collected data showing the dietary of the Jewish urban dwellers and the extent to which this is satisfied by the settlers. Data of this kind are difficult to collect, but his general indications are that during 1937-39 the average amount of food available per head in the cities supplied 2,533 calories daily, 382 grams of carbohydrates, 69 grams of fats and 80 grams of proteins of which 30 were animal. The colonists supplied only 15 per cent. of the calories, 34 per cent. of the animal proteins, about 75 per cent. of the vegetables and fresh fruit, and most of the milk. This shows that the colonists supply a large proportion of the protective foods but a small part of the calories. The calorie supply could be increased by growing more cereals, sugar beets, potatoes, oil seeds and producing more milk. The import of cereals has been large—some 80,000 tons excluding rice. While yields in the colonies may be increased there is no indication that any large part of this

can be raised without opening up new ground. Volcani has discussed the Negev as a possibility if water can be found there and if the nomads can be induced to settle.

But there is no harm in an import of cereals. Denmark, one of the most prosperous agricultural countries before the war, had a considerable importation; cereals in any case are more suitable to mechanised cultivation on large farms than to intensive cultivation on small ones.

Sugar beets and potatoes require irrigation for the best results and so have to compete with fruit, vegetables and green forage crops. Each colony must find its own answer to the question whether it will pay to spare water for them.

Oil seeds might be grown in larger quantities. The total deficit is considerable: nearly 21,000 tons of ground nuts were imported in 1939. Some of these could be grown, as could sunflower and soya.

But it seems more likely that the best prospects for the colonists will lie in the production of the so-called protective foods: fruit, vegetables, milk, eggs, poultry and other meat. These succeed best on intensive farms and are well suited to small farms: per 100 dunams they employ more labour and give a better return per man and per dunam than cereals.

Another reason for developing the protective foods is that the farms of Palestine are

necessarily becoming smaller as its rural population increases:

Average size of farms.  
dunams.

1900	148
1927	78
1936	42

This has been accompanied by a marked increase of production of vegetables, milk, eggs, and above all citrus. Fruit plantations play a dominating part in Jewish agriculture: in 1941-42 the area under fruit was more than a quarter of the whole cropped area while 43 per cent. of the farms had citrus groves.

The White Springs Conference held at Virginia in June 1943, emphasized the need for higher standards of nutrition in all countries of the world. The forty-four participating nations undertook to strive for attainment of these higher standards. If they succeed there will be a heavy demand for the things the Jewish farmers are producing, and if only peace could be assured they should have a prosperous future. The decreasing size of the holdings is accompanied by an increase in the number of collective and co-operative villages which is all to the good. Experience in other countries shows that the small farmer has the best chance of success under an efficient system of co-operation. The growth of collective and co-operative settlements in Palestine is shown by the figures in the appended Table:

	1914	1922	1927	1931	1936	1941	1943
Individualist Villages	11,201	11,543	20,419	28,104	59,516	63,244	70,792
Small Holders' Settlement-s	400	563	1,717	2,441	5,826	10,263	11,688
Workers Small Holders' Settlement-s	—	856	2,944	3,342	9,907	14,540	15,000
Communal Settlement-s	179	1,193	2,624	4,004	11,601	22,932	31,100

Rural population in Jewish Settlements by Social Structure

c = Collective and Co-operators.

“s”: these have characteristics of both individualism and co-operative. They can be included either in ‘c’ or ‘individualist’.



## Utilization of Agricultural Products

In discussions on planning, one encounters frequently a somewhat disdainful comparison of agriculture as an obsolete and wasteful, if necessary, form of economy with industry as a progressive and economical mode of civilized life. Such opinion has two roots: the fact that for many years past, agriculture had to be subsidized by Government, and the impression that industry relies on given resources such as coal and petroleum as its primary materials, which are converted with the help of human intelligence into high-priced commodities, while in agriculture the human hand has constantly to wring the products from an uncertain and not always favourable Nature.

This comparison is brilliant but it is not correct. The economic crisis agricultural countries have experienced is not inherent in agriculture; it is due to the fact that agriculture for the disposal of its produce has mainly looked to the food market and has not had an alternative outlet to absorb market fluctuations. The following pages will show that the chemical industry is such an outlet. The food market is limited because man's want of food is limited biologically, but his desire for industrial goods and services is, at least in principle, unlimited. We have also begun to realize that the reliance upon such given resources as coal and petroleum fails to take into account that such resources can be exhausted, while the soil reproduces plants perennially. Coal and oil are capital, plant crops current revenues.

### Sources of Energy.

Let us consider and compare the ultimate energy resources of agriculture and industry. In harvesting a crop, we utilize the energy of the sun, which in the green plants converts the carbon dioxide of the atmosphere primarily into carbohydrates, into sugar, starch, and the cellulosic materials. The only other chemical directly required in this process is water. The assimilation of carbon dioxide takes place as long as the sun shines, and gives a new crop at least once a year. In mining coal and drilling

petroleum, we make use of physical forces which in an ancient period of the history of the earth have been operative, but have ceased to act. The comparison becomes clearer if we recall the origin of that carbon dioxide in the atmosphere. When we burn coal or oil in our furnaces and engines, when the organism burns its food in the process of respiration, gaseous carbon dioxide is produced; the plant can reconvert it into a useful substance, i.e. a substance richer in energy; but nature can no longer reconvert the gas into coal or oil. (Theoretically the production of oil from carbon dioxide and hydrogen is possible at high temperatures and pressures and in presence of catalysts, but the reaction to-day does not appear economical and it lacks the spontaneity of the assimilation process in nature.)

In the twenty-seventh Thomas Hawksley lecture (1940), A. C. G. Egerton compared quantitatively the various existing sources of energy. The total solar radiation is equivalent to  $5 \times 10^{23}$  horse powers (h.p.) but only about one two-thousand-millionth of it reaches the earth ( $2.3 \times 10^{14}$  h.p.) and again only about 0.01 per cent. of that amount is the radiant energy assimilated by the green plants ( $3 \times 10^{10}$  h.p.). Grassland absorbs about 75 per cent. of the incident sunlight, but most of it is dissipated as heat or used to evaporate water. Even so, the energy absorbed in the assimilation process is 15 times greater than that corresponding to the quantity of coal and oil used at present ( $2.0 \times 10^9$  h.p.). Another figure is perhaps still more impressive: if it is correct that it has taken thirty million years to accumulate the existing  $15 \times 10^{12}$  tons of solid fuel (i.e. 500,000 tons per year), this amount is only one millionth of the total plant life which the radiant energy of the sun produces per year.

The sun can be considered as truly inexhaustible—if all its substances were converted into radiant energy at the present rate it would last  $10^{13}$  years—and therefore plant life, agriculture, is inexhaustible. It is a more satisfactory foundation on which to base our civilization than coal or oil, on which the present day's industry

largely relies, because it is constant and it thrives on the waste products of our life.

There is one other energy-converting force which can be likened to the sun-dependent assimilating apparatus of the plant, viz. the bacterial metabolism. There are some bacteria which, like the green plants, assimilate carbon dioxide. others which derive their energy from other inorganic products, such as sulphur or nitrates. Most of them, and those most important to mankind, however, live on carbohydrates and thus again ultimately on the energy of the sun, without which the carbohydrates would not exist. Due to their rapid multiplication, the bacteria carry out an enormous amount of work and, utilizing them, we again make use of a constant and inexhaustible source of power. It is not unlikely that the assimilation of carbon dioxide by bacteria was a precursor of that by green plants in the development of life on the surface of our earth. From the point of view of the economy of energy, the main difference between plants and bacteria is that the gain of energy in the assimilation process of the green plant (difference in potential between carbon dioxide and carbohydrate) is very great, that in a sugar fermentation process relatively small (in the order of magnitude of 3 per cent. of the total energy content of the sugar). However, the rapid multiplication of the bacteria and the large amounts of sugar they are able to convert, make up for that deficiency.

We will see how the utilization of the energy of the sun and of the bacterial cell, of the macrocosm and the microcosm, may permit agriculture to become a sound basis for modern industry, so that the apparent antagonism will disappear, to which reference was made in the introductory paragraph of this paper.

#### Agricultural Industries.

As a matter of fact, the idea of basing an industry on agricultural products is not at all new, not newer than the attempt to introduce industrial methods in agricultural operations. The utilization of cotton and other natural fibres in the textile industry is a pertinent example, especially if one takes into consideration their utilization in the industrial production of such synthetic or rather processed fibres as

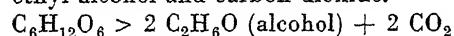
viscose or rayon. While these fibres are of cellulosic nature, another vegetable product, viz. protein, has recently found much interest as a starting material for processed fibres. From peanuts and from soya (as well as from casein) fibres are being developed which exhibit some interesting properties. The protein is treated with alkali, extruded into acid, wound into skeins and subjected to a superficial reaction with formaldehyde. The tensile strength of such a fibre derived from soya is 80 per cent. of that of wool; water does not wet it as easily as wool, and it appears to be much less easily attacked by moulds. Plastic resins, too, can be made from such vegetable proteins by condensation with formaldehyde, furfural or other aldehydes; and the possibilities of such an agriculture-based industry will be realized from the fact that, e.g., America produced (in 1941) 112 million bushels of soya beans, which is equivalent to over 1,000,000 tons of protein. Such an industry is of interest to Palestine, too, as its soil appears to be particularly suitable for peanuts, of which the unusually high yield of 400 kg. per dunam (1,600 kg. per acre) is obtained. In 1942, 30,000 dunam have been planted with peanuts. Soya, too, has been introduced in Palestine in recent years. These crops provide an excellent example of agricultural planning: their protein can be used for purely industrial purposes or it can be diverted into the food market, especially since methods have been discovered to make these vegetable proteins as palatable as, and physiologically equivalent to, the animal proteins to which we are used.

#### Fermentation Industries.

More far-reaching in their implications, however, are the possibilities of an industrial utilization of carbohydrates. In using carbohydrates, we utilize the primary and simplest products of the assimilation process—proteins and oils are secondary products of the cellular synthesis—, carbohydrates consist only of carbon, oxygen and hydrogen, and their synthesis, therefore, does not deprive the soil of nitrogen, phosphates and other ingredients which determine its fertility. There is also an important sociological factor which should not be overlooked. With every

improvement in living standards, the consumption of carbohydrates decreases, and that of fats, proteins and fruits and vegetables increases. Carbohydrates are poor man's food as is evidenced by the fact that in Rumania, India and China 80 to 90 per cent. of the caloric intake consists of starch (cereals, potatoes), in countries like Italy, Spain, Greece and Lithuania 60 to 70 per cent., while the corresponding figure for England (pre-war), the United States, Switzerland or Sweden is barely higher than 30 per cent. With an improvement in living standards, the carbohydrate production will still more exceed the demand than it has been the case hitherto.

The industrial utilization of carbohydrates by means of *fermentation* is probably, in its primitive forms, one of the most ancient industries. Alcoholic beverages have been known to all primitive nations; their production was originally based on the mostly accidental reaction of the sugar in sweet fruit juices with wild yeasts of the atmosphere. To-day, both the beverage industries and the manufacturers of industrial alcohol, everywhere, use biologically defined "pure" strains of yeasts, but the process is still the same: a sugar molecule is split into ethyl alcohol and carbon dioxide:



However, ethyl alcohol is by no means any longer the only product available by fermentation of carbohydrates. It was Dr. Chaim Weizmann's discovery of the acetone-butyl alcohol fermentation which directed the attention of research and industry alike to bacteria, or rather: micro-organisms in general, which can cause unusually complicated transformations of carbohydrates into industrial chemicals, and in recent years a number of other fermentation processes have been successfully developed on an industrial scale.

The formula of their end products gives an impressive picture of the synthetic power of the bacterial cell; some of these products are accessible to the synthesizing organic chemist only by devious routes and not without difficulties; and we are still wondering in many of these cases how the cell does achieve such a transformation of the sugar.

Carbohydrate  $\text{C}_6\text{H}_{12}\text{O}_6$  can give

Ethyl alcohol	$\text{C}_2\text{H}_6\text{O}$
Acetone	$\text{C}_3\text{H}_6\text{O}$
Propionic acid	$\text{C}_3\text{H}_6\text{O}_2$
Lactic acid	$\text{C}_3\text{H}_6\text{O}_3$
Glycerol	$\text{C}_3\text{H}_8\text{O}_3$
Butyl alcohol	$\text{C}_4\text{H}_{10}\text{O}$
Butyric acid	$\text{C}_4\text{H}_8\text{O}_2$
Butylene glycol	$\text{C}_4\text{H}_{10}\text{O}_2$
Fumaric acid	$\text{C}_4\text{H}_4\text{O}_4$
Itaconic acid	$\text{C}_5\text{H}_6\text{O}_4$
Citric acid	$\text{C}_6\text{H}_8\text{O}_7$

For each of these bio-syntheses, a particular micro-organism or a group of closely related organisms is responsible, which is being propagated as pure strain and kept and guarded with the care due to such a precious tool of synthetic chemistry. They all demand specific living and nutrient conditions. Some of them can only ferment such low-molecular sugars as glucose or fructose (mono-saccharides), some are able to ferment starch, most probably after hydrolyzing it to lower-molecular sugars. Generally speaking, the starch-fermenting micro-organisms as, e.g. the Weizmann bacterium, are more suitable for an industry based on agricultural produce, as starch is more ubiquitous than sugar; its formation is not limited to the tropics. Furthermore, the saccharification of starch for non-starch fermenting bacteria involves an additional industrial operation.

The scope of fermentation industries has been widened considerably in recent years by the development of methods for the saccharification of cellulosic and hemi-cellulosic materials. By their chemical nature, these materials are also high-molecular carbohydrates, but they are not attacked and fermented by bacteria. Richard Willstaetter was the first to show that acid hydrolyses wood and straw and similar materials to low-molecular, fermentable carbohydrates, and Germany, and more recently the United States, has succeeded industrially to ferment such wood sugar solutions and to convert them into ethyl alcohol. Even the so-called sulphite liquor, a waste product of the paper industry, has been successfully used as a substrate for fermentation processes.

In Palestine, a modest fermentation industry existed before the war and has somewhat increased since. Before the war, the production

was limited to ethyl alcohol, which had been produced from imported molasses or from the locally available carobs (St. John's Bread), the fruit of *Ceratonia siliqua*. Since the war acetone and butyl alcohol have been produced, mainly from durra, a Middle Eastern cereal. Lactic acid, too, is being produced from whey, which is a by-product of the dairy industry. It is interesting to note that a plan has been developed in Palestine to use the surplus citrus fruit as substrate for such technical fermentation processes, a method which even in normal times would permit the utilization of the 25 per cent. of culls, which are not up to the standard of the export trade. The orange juice contains about 10 per cent. fermentable sugar, and the same is true—surprisingly enough—of the peel which appears to be a particularly good starting material for fermentation. Of course, the particular crop to be fermented will vary with conditions, a fact which will be discussed in a later section, but the case of the citrus fruits is a good example for the thesis of this paper that the diversion of agricultural produce into the channels of the chemical industry will help to stabilize the economic position of agriculture as a whole.

This chapter would be incomplete without reference to some important "by-products" of the bacterial metabolism. Penicillin is such a by-product in a particular case, and its study has led to the discovery of a fairly large number of similar "antibiotics" such as streptomycin or thyrothricin, substances produced by certain micro-organisms and able to destroy other, e.g. pathogenic micro-organisms. These substances are not yet available by any other method but the intermediate of living cells, and although they are produced in very small quantities, it is worthwhile to grow the micro-organisms concerned only for these drugs. In other cases, the normal, well-known fermentative activities of bacteria are accompanied by the production of such useful substances. It has been known for a long time, that yeast not only produces ethyl alcohol but also ergosterol, a substance from which one of the antirachitic vitamins can be made, and vitamin B<sub>1</sub> (thiamin). As a matter of fact, one has "trained" yeast by feeding it on certain substances, to produce abnormally large quantities of that latter vitamin. The

Weizmann bacterium does not only give acetone and butyl alcohol and minor quantities of ethyl alcohol, but also vitamin B<sub>2</sub> (riboflavin), which for quite a time gave as good returns on the capital investment in a fermentation plant as the major products, acetone and butyl alcohol. All these "by-products" belong to the most complicated organic molecules known; thus, the hidden synthetic forces of the bacterial cell, which has at its disposal only the very simplest chemicals as building stones, are thrown into relief perhaps much more by the formation of the small quantities of these substances than by that of the large amounts of "major" fermentation products. In order to give the correct impression of the orders of magnitude concerned it might be mentioned that while the yield of acetone and butyl alcohol obtained from 100 g. glucose is about 33 g., that of penicillin from the same quantity of glucose is only 0.5 g.

#### Industrial Chemicals from Fermentation Products.

The industrial importance of the fermentation industry is not limited to the possibility of directly providing a number of important chemicals. It makes them available in such quantities that they in turn can become the starting point for industrial processes. It is no exaggeration to say that, from a purely chemical point of view, all the important chemicals and commodities which the petroleum industry has so brilliantly succeeded in synthesizing from mineral oil, can be produced equally well from the primary products of fermentation processes. A somewhat simplified description of the position may suffice to support this statement.

The prime importance of natural mineral oils lies no longer in their value as direct fuel but in the possibility of producing—by cracking processes—certain basic chemicals, from which many others, including rubber and plastics, are available. To give only one example: aviation fuel is no longer a petroleum fraction, it is largely a synthetic product made from petroleum by a breakdown to certain unsaturated, small molecules and subsequent directed re-synthesis of larger, "tailor-made" molecules. These small molecules are ethylene, propylene and the butylenes possessing respectively two, three and four carbon atoms.

One single fermentation, the Weizmann process, gives, as stated above, ethyl alcohol with two, acetone with three and butyl alcohol with four carbon atoms, substances which are closely related to, and interconvertible with, the three fundamental cracking products from petroleum. Acetone, e.g., can be made and is being made by a two-step reaction from propylene and constitutes a major outlet for the propylene produced in the petroleum industry.

From butylene, and therefore also from butyl alcohol, chemical synthesis leads to the iso-octanes, the mainstay of to-day's aviation gasoline, and on the other hand to butadiene. This in turn can be converted into styrene, one of the main starting materials for the plastics industry. Butadiene and styrene combine to the most important of the synthetic rubbers, GRS or Buna S. Ethylene, and therefore also ethyl alcohol, can be transformed into acrylonitrile, which together with butadiene forms another synthetic rubber, Buna N, or into acrylic acid, again a basic product of the plastics industry. Acetone is the raw material for a third important plastics constituent, methacrylic acid and, with the help of acetylene, can be converted into isoprene, the building-stone of natural rubber and an ingredient in several synthetic ones, and into methyl-chloroprene, the homolog of the technically important chloroprene from which the valuable synthetic Neoprene rubber is made. A long series of other, not less important, chemicals are being made from these three fundamental molecules, e.g., glycerol, solvents, plasticizers, emulsifiers and detergents. In short, all the impressive display of "petroleum chemicals" can be duplicated by the fermentation industry. Moreover, some chemicals which can easily be made from fermentation products are not or not as easily available from petroleum. This applies particularly to butyl alcohol and its simple derivatives, to which only a rather tedious way leads, if one wants to start from mineral oil or its cracking products. On the other hand, it must be conceded that with regard to a certain type of chemicals, viz. the aromatic hydrocarbons, those indispensable starting points of the dye-stuff and pharmaceutical industry, fermentation industry is at a disadvantage. Not that it were not possible to produce aromatic hydrocarbons from fermentation products: we

have mentioned already the synthesis of styrene from butadiene; acetone is known for a long time to be convertible into mesitylene, a trimethyl-benzene; and butadiene can be combined with ethylene or propylene to give—ultimately—benzene and toluene, respectively. These syntheses, however, make the products relatively expensive, and the characteristic feature of coal to give, upon dry distillation, the whole gamut of the aromatic hydrocarbons, from benzene, the lowest, to their highest member, is not shared by any reaction of fermentation products in an economically attractive manner. However, until very recently, petroleum could not be transformed into these aromatic hydrocarbons either, and it appears as a sufficient justification of a chemical industry based on fermentation if only part of the important industrial chemicals can be made from primary fermentation products. Such an industry does not aim at replacing petroleum or coal but at supplementing them. The importance of such a possibility will be evident if we recall how much an early exhaustion of existing petroleum wells is feared to-day. If we can relieve these fears by using for a certain part of the petroleum chemicals sugar as raw material, we might be able to avoid some of the impending dire consequences to which the recent development of international oil politics seems to lead. Palestine must be particularly interested to counteract that threat; it can do so by proving that a chemical industry based on fermentation products is a practical, a sound proposition.

#### A Fermentation Industry.

If Palestine chooses to create a fermentation industry with a view to producing chemicals from the primary products of fermentation, it will have to select a suitable crop as raw material, a crop which gives a maximum of fermentable carbohydrate per unit area. How much the yield in such carbohydrates can vary will be evident from the following Table, which refers to the fermentative production of the mixture of acetone, butyl alcohol and ethyl alcohol ("solvents") formed in the Weizmann fermentation. It assumes a yield in solvents of 33 per cent. by weight of the fermentable sugar.

Species	Yield of crop per acre	Fermentable carbohydrate		Acreage required for 1 ton "solvents"
		in % of crop	in ton per acre	
	ton	%	ton	acres
Sugar cane in Hawaii .. ..	80	15	12	0 25
Sugar cane in the United States	30	15	4 5	0 7
Bananas .. . . .	12 1	25.5	3.1	1
Jaffa Oranges . . . .	16	11	1.76	1.7
Sorghum .. . . .	2 67	65	1 76	1.7
	(optimum)			
Potatoes in California .. .	8 5	16 6	1.4	2.1
Maize .. . . .	2 1	65	1 38	2.2
Dates .. . . .	2	65	1 3	2.3
Rice in Hawaii . . . .	1 67	65	1 08	2.8
Potatoes .. . . .	5 7	16 6	0 9	3 3
Wheat .. . . .	1 07	70	0.75	4
Sweet potatoes in California ..	3 3	22 6	0.75	4
Rice in the United States .	0 81	65	0.53	5.6

There is reason to believe that these yields can be improved. We have learned in many cases that cross-breeding or selection can increase the amount per plant of a given valuable constituent. One might even be able to apply the methods of chemical or physical alterations in the chromosomes to force the particular plants to produce more carbohydrates. Some very elementary attempts in this direction have been made in Palestine. Before the war, the yield of (hard) wheat in Palestine was 500 to 680 kg. per acre; recently, a variety of soft wheat has been developed which gives as much as 40 to 70 per cent. more, a figure which tallies with that given in the above Table.

Another important question which deserves the effort of the scientist, is posed by the fact that only a very minor proportion of the solar energy falling on a green leaf is utilized in the assimilation process; on the average, the efficiency of the green plants is only 1 per cent. Could one not artificially increase this efficiency?

However, the major problem in this respect is whether there is enough land available to produce carbohydrate crops on the scale which is required to support a primary fermentation industry and the secondary chemical industries,

which have been superficially described above. One of the outstanding tasks of the future Palestine will be the colonization of the Southern desert, the Negev, which occupies about half of Palestine. It is barren land—it has not always been that—and, more serious than that, it is saline as most of its water is. It has been known, however, that dates can be grown on such soil and specific experiments carried out in Palestine have confirmed that. Now dates provide an excellent substrate for fermentations, and a colonization of the Negev by growing dates with a view to utilizing them for a fermentation industry is a possibility which deserves examination, particularly as an uninhabited area like the Negev will permit an easier and freer settlement of the immigrants from Europe, for which Palestine must prepare.

But the hope of such a project need not and must not be limited to Palestine alone. Palestine is surrounded by large areas which in ancient times have prospered by their agriculture and which can be reconstituted to their former fertility. In any event, the first step in the development of these areas which have recently attracted so much interest, can only be the establishment of agriculture. This will be a



sound proposition if an industry like that which is being outlined in this paper can absorb the products and convert them into higher-priced and more durable commodities. Of course, the availability of land alone is not sufficient to warrant the introduction of large-scale agriculture; it requires, in addition, water and fertilizers. Palestine is in the unique position that it is one of the richer sources of potassium salts (in the Dead Sea) and also of phosphates which, however, await yet exploitation. It would be able to supply the whole Middle East with sufficient fertilizer to improve the soil and restore its fertility. And there is no reason why projects like the Tennessee Valley Authority in America or the much discussed Jordan Valley Authority should not be imitated for the great rivers of Mesopotamia, with the same beneficial effects for the area concerned. If one postulates that not all of this agricultural effort need be diverted to the production of industrial raw materials, but also that the standard of food supply in the area can thus be improved, one will find again that the balance of the two possible outlets for the produce of the soil will give agriculture the greatest measure of usefulness.

#### Medicinal Products.

We have discussed so far only those possibilities of the utilization of agricultural products which, by the magnitude of the task involved, are most conspicuous. There is another profitable possibility for an agricultural economy: that is the cultivation of plants containing biologically active substances. Medicinal plants and plants with insecticidal power belong into this class, which constitutes a relatively small volume of agricultural production, but has a high value. There are still some natural drugs which cannot be adequately reproduced or imitated by the chemical laboratory, such as the digitalis substances, the active glucosides of *Scylla maritima* (Red Squill), *santonine* or *morphine*. Equally,

the insecticidal principles of *Derris elliptica* (rotenone) and of *Pyrethrum* (pyrethrines) are still irreplaceable. Although this situation might change—as it has been the case with so many natural products—it is considered worthwhile to rely on the large-scale cultivation of the plants concerned. In Palestine 30 species of industrially useful plants are cultivated to-day and about 120 more are being imported. Here again, is room for an intensification of this branch of agriculture by the application of recent scientific discoveries, such as cross-breeding or the alteration of the chromosomes. It might also be possible to increase the yield in active principles by feeding the plant with those raw materials from which modern biology assumes that those active substances are synthesized with the help of the specific plant enzymes.

#### Palestine as Pioneer.

In its entirety the picture which these pages have attempted to draw represents a plan for a new type of industrial economy in the future Palestine. But it is a plan adaptable to many parts of the globe which have no share in the existing reserves of oil and coal, but enjoy the tropical sun and its sugar-synthetizing power. It is a plan which might well become of interest as a supplement to the type of economy which is based on coal and particularly on oil. Palestine has been a pioneer country in many respects; it might become the pioneer of that new type of economy which aims at a harmonious co-operation of industry and agriculture, in which agriculture will not have to suffer from every contracting and expanding movement in industry, as in the past, because of the fact that shrinking purchasing power reflects itself first on the food market. Agriculture will be able to shape industry, and Palestine in such an effort will be supported not by geological forces which belong to the past, but by those forces in nature which are truly eternal.

## The Dead Sea and the World Potash Industry

Potash as a chemical was known in ancient times. There are Biblical records of its use by the Israelites. The Romans in the pre-Christian era produced it from wood ash and used it as a cleanser, as a raw material in the preparation of soap and as a purgative. Potash compounds derived from wood ash and later as by-products from the manufacture of common salt from sea water, were in use in England and France. It was not, however, until the classical experiments and teachings of Dr. Justus von Liebig in the eighteen-twenties, who proved that for the formation of organic matter in the plant a certain quantity of mineral salts in solution was absolutely necessary, that the future of potash was assured. Liebig and his followers proved that besides carbon dioxide and oxygen, which are provided by the air, four mineral substances—nitrogen, phosphorus, potash and lime—are required, that potash is most important for the growth of the plant and that if not present in a solution containing all the other chemicals required, a plant would show neither formation of starch nor increase in weight. It would behave as if it were kept in distilled water. He further demonstrated that crops take from the soil considerably more mineral substances than stable manure could return to it and that exhaustion of the soil was, therefore, inevitable. It so happens that some 15 years later the Prussian State, one of the most important salt producers in Europe using brines derived from wells since the close of the 18th century, decided in 1839 to sink a borehole near Stassfurt with the object of increasing the quantity and density of the brine. At a depth of 256 metres a salt deposit was reached which continued for 69 metres where boring was stopped. Jubilation was great but disappointment came very soon. The taste of the brine was different from that in the ancient wells; there was a certain bitterness in it and analysis disclosed the presence of other salts besides cooking salt, namely, magnesium and potassium. The phenomenon was inexplicable: it could not occur to anyone at that time that this disappointment would in years to come turn out

to be a blessing to humanity and that a great discovery was behind the discouraging result from the borehole.

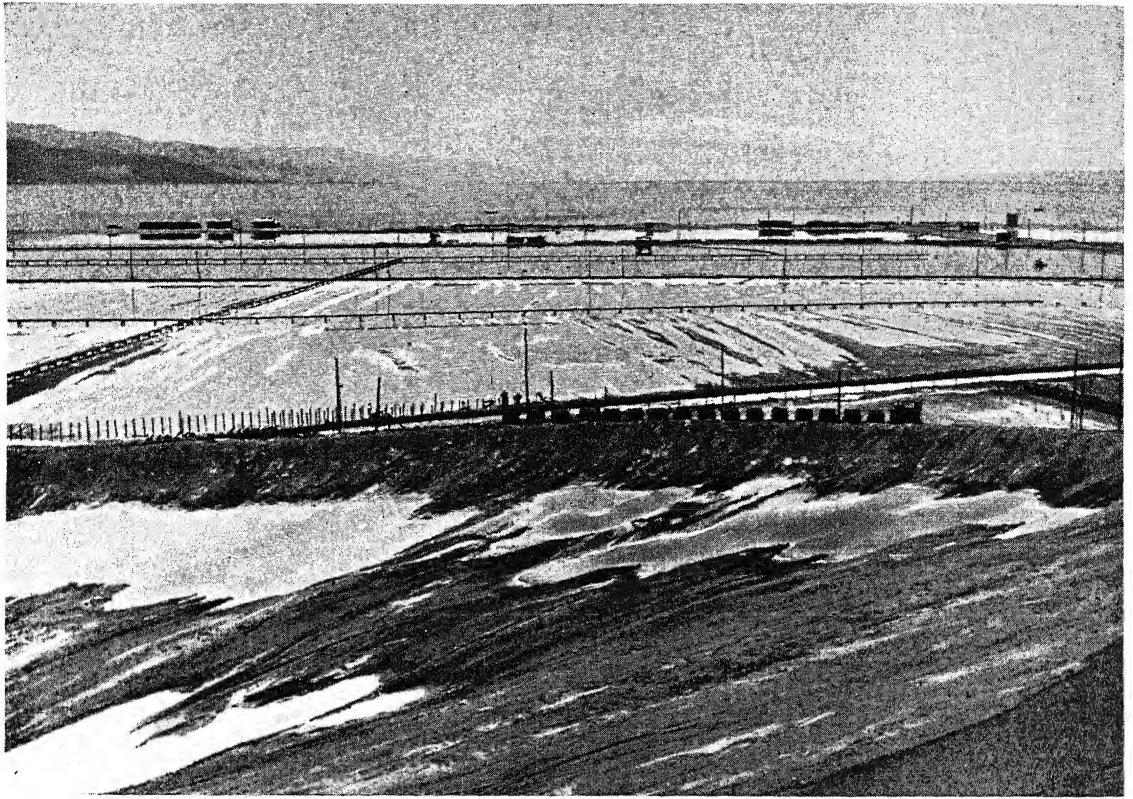
Large deposits of potassium and magnesium salts overlaying rock salt were struck in several shafts sunk some 15-18 years later in order to meet the increased demand for salt, but these deposits which had to be removed at considerable expense in order to mine the common salt represented only a nuisance, and were dumped near the shafts. The discoveries of Liebig had not penetrated yet into the field of applied chemistry. It remained an interesting scientific discovery. Moreover, the methods of refining the crude potash salts from the heaps of Stassfurt were as yet unknown, although several German chemists had been working on the problem. It was only in 1861 that the first patent for the separation of potassium salt from Magnesium Salts, which were considered detrimental to the plants as fertilizer, was granted to Dr. Adolf Frank. Several others followed and by the year 1865 eighteen small refineries were in operation.

Soon after that attention was given to the production of by-products. The same energetic Dr. Frank produced the first quantities of free bromine—some three-quarters of a ton per annum, from the final liquors of his refinery. The price charged in the beginning was £2,500 per ton. Magnesium chloride was put on the market simultaneously, and thus the foundations of a large chemical world industry were laid.

### Germany's Lead.

World War No. 1 found Germany with a potash industry well organized in a powerful syndicate with 164 shafts and 72 refineries, providing employment for nearly 30,000 men. They supplied the home and world markets in the proportion of 55 to 45, with over 1,100,000 tons of pure potash ( $K_2O$ )\* per annum, and had an

\* The expression, 'pure potash' or ' $K_2O$ ' is an arbitrary one introduced into the German industry. In order to convert  $K_2O$  into potassium chloride 80% purity, a grade used in agriculture, the  $K_2O$  figures have to be multiplied by two.



Potash installations

Photo KLUGER

income of over £8,600,000. The industry enjoyed a virtual world monopoly, being its own arbiter as to quantities, grades and prices of potash quoted in all the markets of the world. The first post-war years, however, changed the happy picture. Alsace with its promising potash deposits went to France. From a production of some 40,000 tons in 1913 the capacity of the Alsatian mines was brought up to 192,000 tons in 1920. A dangerous competitor had arisen for Germany. To meet the new situation, Germany undertook two bold measures—a fundamental reorganization or rationalization on a large scale of its potash works, and the conclusion of a cartel agreement with France with the object of restoring the pre-war monopoly. In order to carry through the rationalization scheme a loan of £15,000,000 was negotiated by the Potash Syndicate on the London market in 1925, and a long-term agreement reached with the French potash

industry of which 80 per cent. of the mines were managed by the French State, by which 30 per cent. of the export quota was allocated to the French. Prices were raised and stabilised. The results of the reorganization were fully felt in 1928 when out of the 229 potash mines and 75 refineries with 48,667 workmen in 1922, only 60 mines and 31 refineries with 18,933 workmen remained under exploitation. The joint German-French potash industry enjoyed a period of prosperity and tranquillity and reached its peak in 1929 when the total world production of potash reached a figure of over 2,400,000 tons pure potash or 4,800,000 tons, expressed in terms of potassium chloride (80 per cent.).

#### New Producers.

This tranquillity was, however, short-lived. The lean years were approaching. The great economic depression, particularly in agriculture,

which began in 1929 in the U.S.A. and spread the world over, was felt in the potash industry a little later. In addition, new potash producers made their appearance on the world markets. Spain increased its production from 8,000 tons ( $K_2O$ ) in 1926 to 26,000 tons in 1930 and 90,000 tons in 1933. Poland reached a production of 33,000 tons in 1932. In the U.S.A. new potash deposits were discovered and the total American production of muriate of potash (potassium chloride) increased from 21,000 tons in 1926 to 120,000 in 1933. In 1932 two more potassium producers made their first appearance on the world stage—Russia with 5,000 tons pure potash and Palestine with some 10,000 tons of muriate of potash. The consumption of potash, reduced by the general depression in agriculture by over a million tons in the course of only three years (1929-1932), was, therefore, exposed to another shock—the competition of the newcomers who tried to find some place in the sun for their infant industries, and in so doing considerably lowered the prices stabilised a few years earlier by the German-French Potash Combine. The privileged position of an industrial monopoly, at first only German, and since 1926 a German-French combine, was virtually at an end. Instead of enjoying the enviable position of being the only world producer, Germany had to share company with six others. The monopoly's death warrant was signed and sealed. Against a German-French total production of 1,279,000 tons of pure potash in 1933, the newcomers showed a figure of 300,000 tons. Since, however, out of the 1,279,000 tons produced by Germany and France, 900,000 tons were consumed in their own countries, the balance of only 373,000 tons was exported by the Combine. The home consumption in Germany was reduced by 25 per cent., in France by 15 per cent. from the 1929 figures, while the exports were reduced by some 60 per cent. Germany's exports in 1932 represented only 23.6 per cent. of her total production. The money value of German exports in 1934 was 40 per cent. less than in 1932, although the quantities exported were greater.

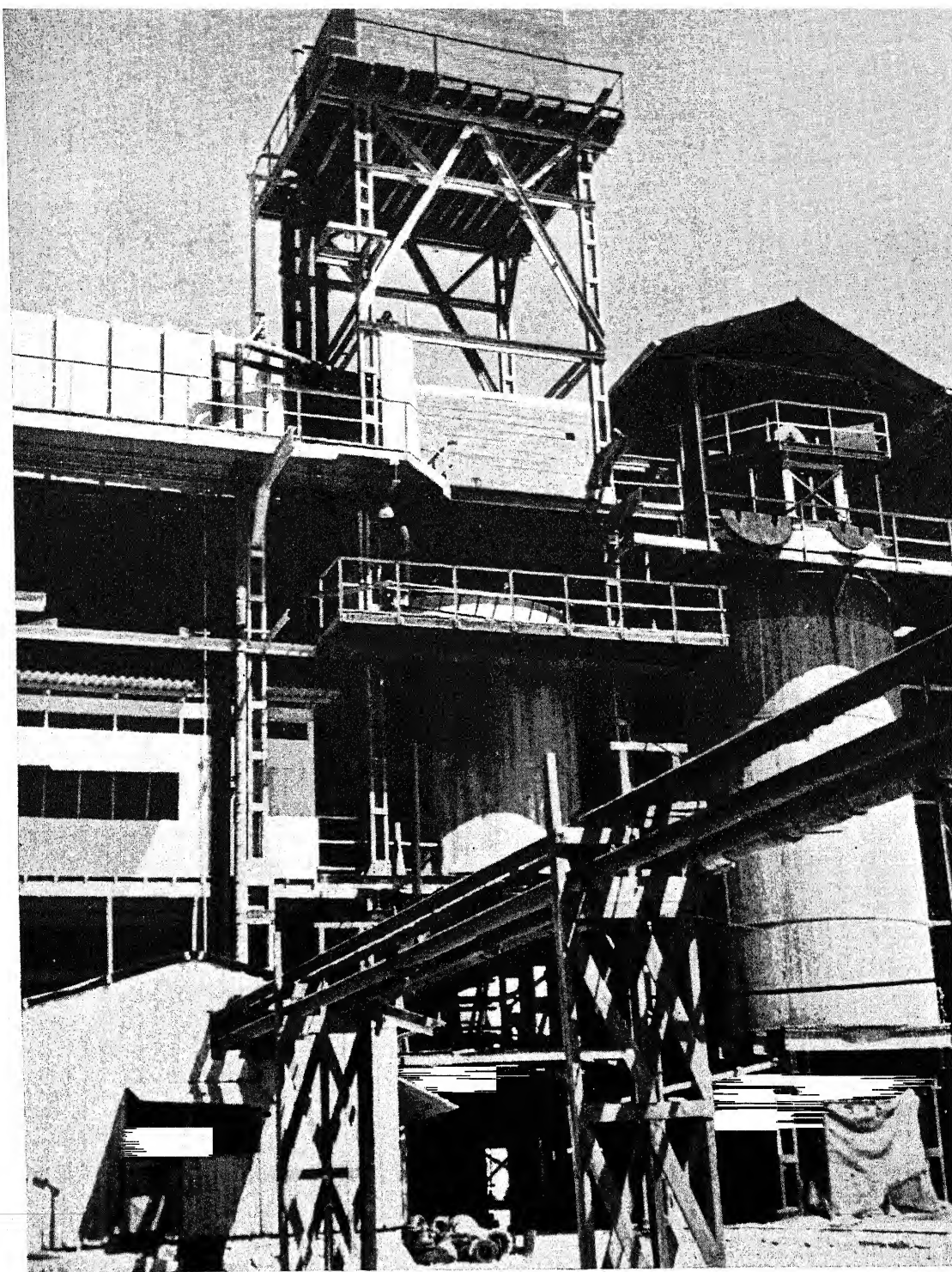
It was only natural that Germany, still the greatest producer in the world, should again try the same method of bringing peace into the

industry which she had successfully used in regard to France some twelve years earlier. The peace proposals made to the newcomers in 1932, and again in 1933, did not meet with success. As a result of those unsuccessful negotiations, a sharp industrial war began and prices quoted in the summer of 1934 were 30 per cent. below the 1933 prices. Then with the development of price-cutting among various producers, prices fell further to 40 and 50 per cent. of the 1932 figures, i.e. below the cost of production.

After a prolonged period of hard bargaining peace was finally restored in the latter part of 1935 and tranquillity brought into the industry. This continued up to the outbreak of hostilities in September, 1939.

### The Dead Sea Industry

The question now arises: Can the Dead Sea with its young industry which is still in the course of development hold its own in the face of the six other members of the family? Is it considered a legitimate child of the family? What are the advantages and disadvantages of the Dead Sea industry in comparison with the others? The quantities of potash contained in the waters of the Dead Sea are, for all practical purposes, unlimited. They would suffice to cover the total present consumption of the world for some 2,000 years. Out of the seven potash producers in the world five use the same old method of production. The raw material—crude potash salt—is produced by underground mining similar to coal mining, and for the refining in the factory steam is used for dissolving the potash in boiling water in order to separate the impurities. Only California and Palestine use different methods. In both these countries the potash is not mined underground but occurs in liquid form, in solution, and is pumped out, either from wells—in California—or from the depths of the Dead Sea in Palestine. At this point, however, the similarity between Palestine and California ends. The method of refining used in Palestine is different from all others, including California. The potash refinery in California uses steam even more than do the factories of the European producers, while Palestine uses only fresh, cooled water from the



Potash installations



Jordan. Besides the oil for generating power and some little quantities of crude oil for drying the finished product, the Palestine method of production is based on only three raw materials, all found on the spot: (1) the water of the Dead Sea, pumped into large shallow pans, (2) the hot sun shining over the pans and evaporating the sea water in the course of over nine months in the year, and (3) the Jordan water, dissolving the other salts (impurities) in the raw potash produced in the pans and so refining the potash. In the nature of things, no other potash producer can show a simpler and cheaper method of production. On the other hand, the disadvantage of the Dead Sea industry lies in the present somewhat primitive transport facilities, which are offset by low cost of production.

The concession for the extraction of chemical salts from the waters of the Dead Sea was signed on 1st January, 1930. Construction began very soon after and the plant with a production capacity of 10,000 tons of potassium chloride (muriate of potash) per annum was completed at the end of 1931. The results of the first year's operations having proved satisfactory (some 9,300 tons of muriate of potash were produced in 1932), the plant was extended to a capacity of 30,000 tons per annum.

The potash industry of Palestine is essentially a matter of evaporation area and large quantities of production. In 1937 the Company extended its works at the south end of the Dead Sea to the 'Sodom and Gomorrah Area' where much more flat land suitable for construction of evaporation pans is available, and production there is now larger than at the plant at the north end of the Dead Sea. The total production has more than trebled since 1937.

The seasonal year 1934-35 suffered considerably from low prices as a result of the price war (a 50 per cent. drop) and the Company incurred heavy losses. It was only in the second half of 1935 that a definite recovery could be recorded. Prices were increased and gradually stabilized in nearly all the world markets.

The Company was unfortunately hampered in its development by three years of disturbances—1936-38, which were followed by nearly six years of war.

Potash from the Dead Sea has reached most of

the world markets: Great Britain, Irish Free State, Holland, Czechoslovakia, Austria, Italy, Greece, India, Ceylon, Dutch East Indies, South Africa, Australia, China, Japan, U.S.A., and Canada.

#### World War Expansion.

During the war years Palestine Potash Ltd. covered nearly half of the greatly increased demand for potash in Great Britain and 80 per cent. of the Dominions—India, Australia, New Zealand—except Canada, which was supplied by the U.S.A.

Official figures just published by the Board of Trade show that imports of chemicals from Palestine to the U.K. in 1944 amounted to £1,000,000, making Palestine the fifth largest source of supply to the U.K. after the U.S.A., Canada, Switzerland (£1.4 million) and Argentina (£1.2 million). Nearly all chemicals from Palestine have as their source the Dead Sea.

Potash is not the only chemical manufactured at the Dead Sea. Considerable quantities of bromine and bromine compounds, including pharmaceutical bromine salts, have been supplied to the U.K. market before and particularly during the war years.

Bromine production has been steadily increasing from 200 tons despatched in 1931 to some 1,000 tons in the war years. Bromine prices have not been exposed to such great fluctuations as those of potash and remained comparatively steady. Bromine and bromine Salts have found a ready market in the pharmaceutical, dyestuffs and photographic trade in Great Britain, which before the war took over 75 per cent. of its bromine supplies from Palestine.

Palestine Potash Ltd. has started production of chlorine, caustic potash and potassium chlorate used for matches and as an explosive. It also sells locally some table and magnesium salts for local needs and exports. Further products extracted from the waters of the Dead Sea are 'Salsana' Bath Salts used locally for medicinal use in the treatment of rheumatism and some other diseases, 'Anti-Dust' liquor, an excellent material for laying dust, particularly in countries with a hot climate, and 'Frigor,' derived from the waters of the Dead Sea, which replaced



calcium chloride as a refrigerating agent in Palestine and the whole Middle East during the war years.

To the agricultural community of Palestine, which always imported potassium salts from Germany and France to the extent of some £8,000 to £10,000 per annum, the Dead Sea has been supplying all requirements, and no more imports of this fertilizer into the country from abroad have been coming in. During the war years the Dead Sea supplied potash to most of the neighbouring countries: Syria, the Lebanon, Egypt, Turkey and Tripolitania.

The Dead Sea potash industry in its infancy had to go through a severe war declared by the older members of the industry. It emerged from the battlefield alive and its legitimate membership in the potash family, based on its past achievements and future possibilities, has been recognized and acknowledged by other members.

#### International Regulation.

The history of the German potash industry from its very inception has sufficiently proved that an industry of this kind, dependent upon world markets, cannot exist without proper international co-ordination and regulation. It had to follow the path recognized for a number of other commodities, e.g. cotton, sugar, tea, rubber and even wheat. The regulation of the world potash industry, in view of the very limited number of producing countries—only seven—is a less difficult matter than was the task of regulating other industries with their great number of producers and where the method of regulation has been tried out. It is not expected that the old system of cartels has any chance of being re-established in the post-war period in view of the abuses which have been disclosed particularly in the United States during



Potash port

Photo KLUGER



Workers' settlement at the southern end of the Dead Sea

*Photo JEWISH AGENCY FOR PALESTINE*

the war years. It may however be taken for granted that some form of inter-Governmental regulation of production and supply in which the consumer as well as the producer will participate will be introduced. It is hoped that the chaotic state of production and supply in many staple industries which was witnessed in the period following the first World War will thus be avoided. In considering the future of the potash industry of Palestine, the other chemical salts contained in the waters of the Dead Sea also have to be borne in mind. The content of magnesium salts is ten times as great as that of potash. The Dead Sea is also the richest source of bromine salts. With the further development in the use of magnesium metal, the "metal of the future," which may in years to come partly replace aluminium, the Dead Sea may become

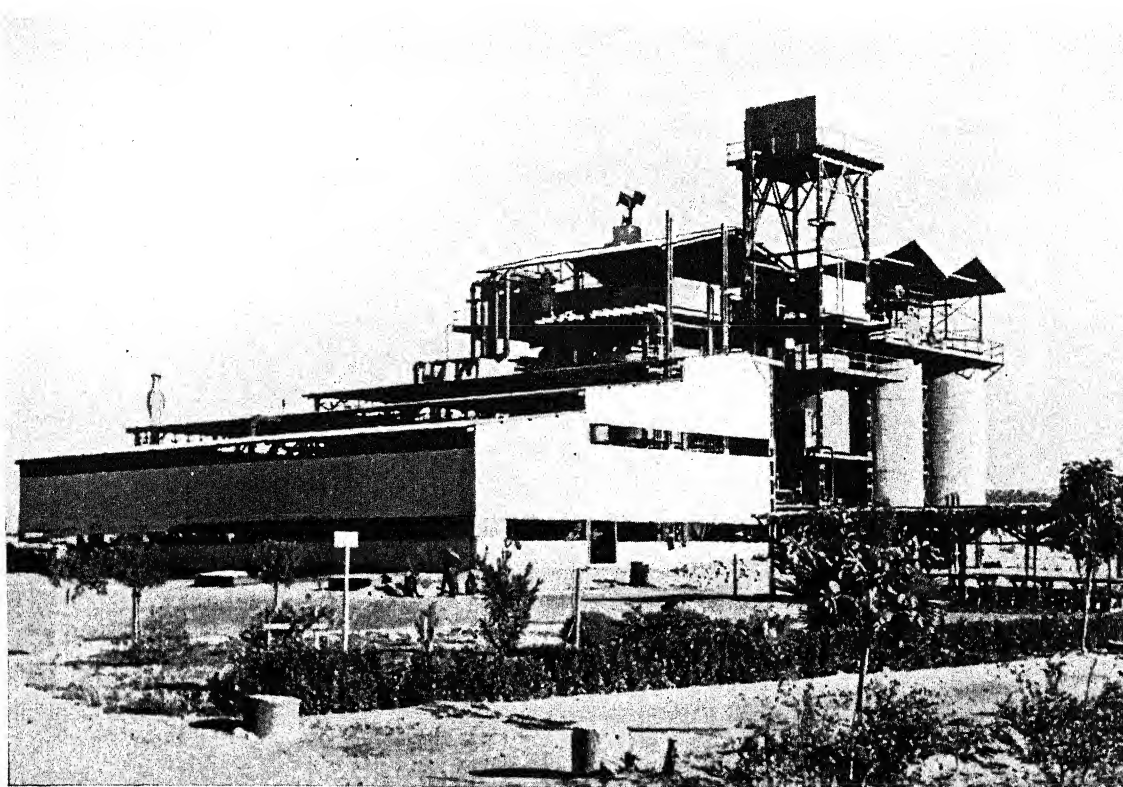
an important producer of this metal. This, notwithstanding the set-back which this industry suffered at the end of the war from the great over-production in the U.S.A. With the discovery of new applications of bromine and the reduction in cost of its production, potash may in future represent only a raw material for a great chemical industry to be developed on the Palestinian shores of the Mediterranean. The manufacture of many compounds of sodium, potassium, bromine, magnesium and a number of fine chemicals would form the object of this industry. This stage of development may have to wait until the present inflated economic position in Palestine with its high cost of living, high cost of labour, transport, etc. has been readjusted as a result of the full change over from war to peace in the world generally.

Reviewing the history of the potash industry generally and of its present position, one may naturally ask: What of the future? Has this industry with more than three-quarters of a century of history behind it, already reached its maturity, or has it hopes of still further growth and development? Will the world be willing to absorb much larger quantities than in the peak year of 1929? The table below showing the consumption of potash per hectare ( $2\frac{1}{2}$  acres) of arable land in various countries gives a definite reply to the question:—

Kilograms of Potash ( $K_2O$ ) per Hectare of Arable Land.

	1913	1937
Holland	20	108.4
Germany	15.3	51.4
Belgium	6.8	47.2
Gt. Britain	1.8	11.0
France	0.9	12.3
U.S.A.	1.2	2.5
Italy	0.3	1.2

A small country like Holland with her highly developed agriculture heads the list, and uses



Refinery in the South of the Palestine Potash Works.

*Photo KLUGER*

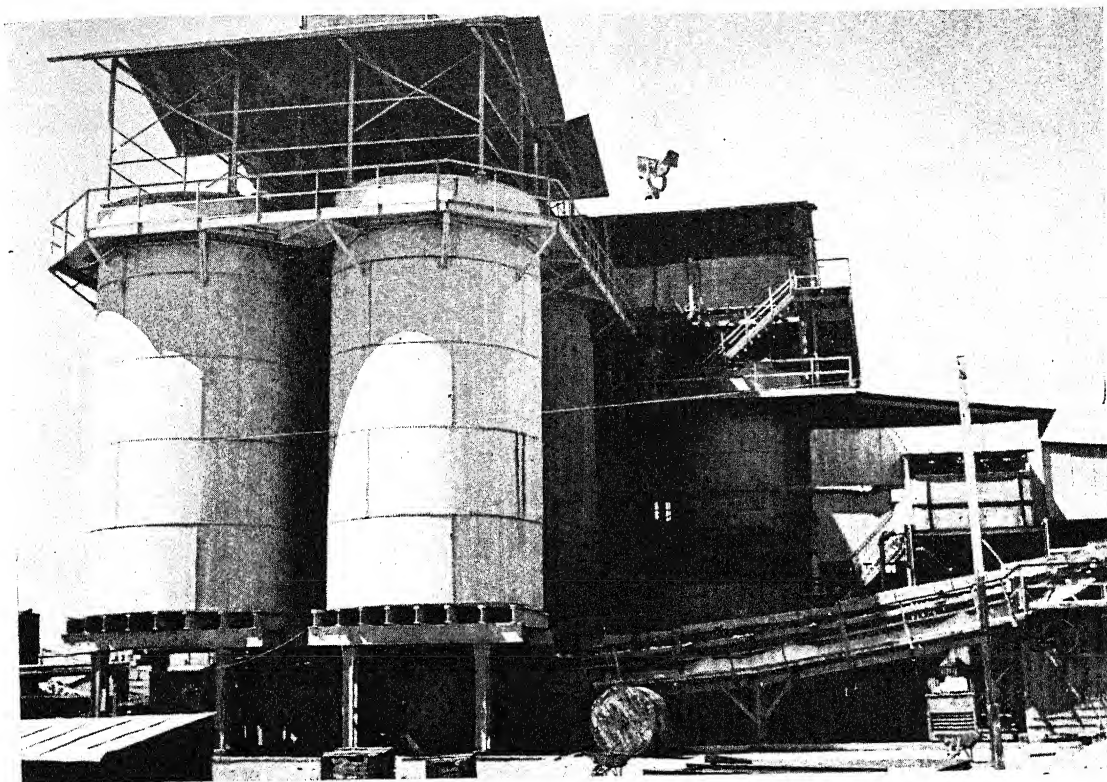


Photo KLUGER

Potash installations

ten times more potash per unit of arable land than Great Britain and 43 times more than the U.S.A. In order to be able to express an opinion on the prospects of the potash industry, one has to bear in mind that 90 per cent. of potash produced is taken up by agriculture, that most of the more highly developed countries, as shown in the above table, use the fertilizer only to a very small degree, and that the large agricultural countries, like China, India, Australia, Canada and Argentina are only beginning to import it. If it is further borne in mind that potash does not compete with the two other main fertilizers—phosphates and nitrogen—since they serve different purposes in plant cultivation, and that the application of one or two of them generally necessitates the

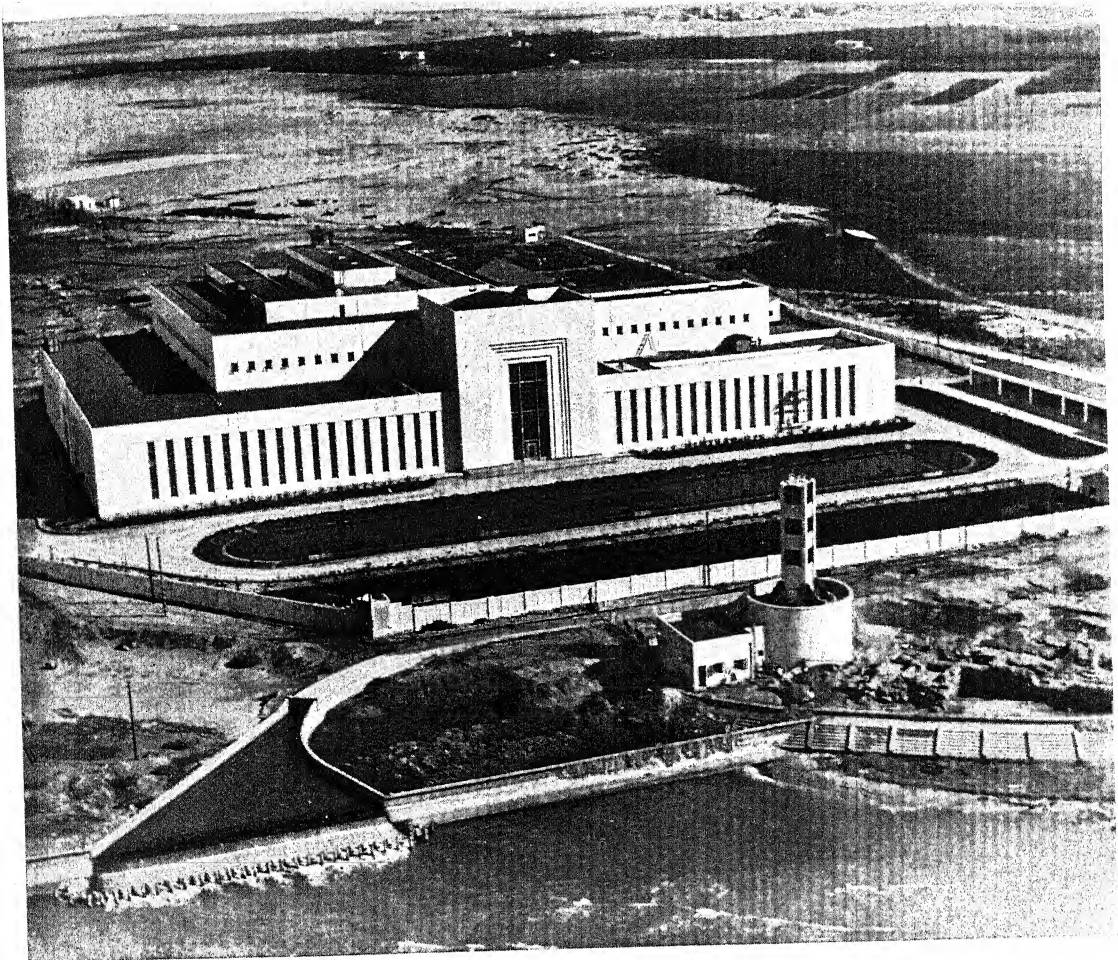
addition of the third—one must inevitably come to the conclusion that the Potash industry, so far as consumption is concerned, is only in its infancy. With the exhaustion of the soil in many countries by intensive cultivation, the gradual enlightenment of the backward agricultural communities and the general improvement in the world economic situation, the use of potash, as well as of the other two fertilizers, is bound to increase from year to year.

The Dead Sea, that immense storehouse of soluble chemical salts situated near the Mediterranean, which the world requires and will require more as time passes, will undoubtedly play an important part in the chemical industries of the world.



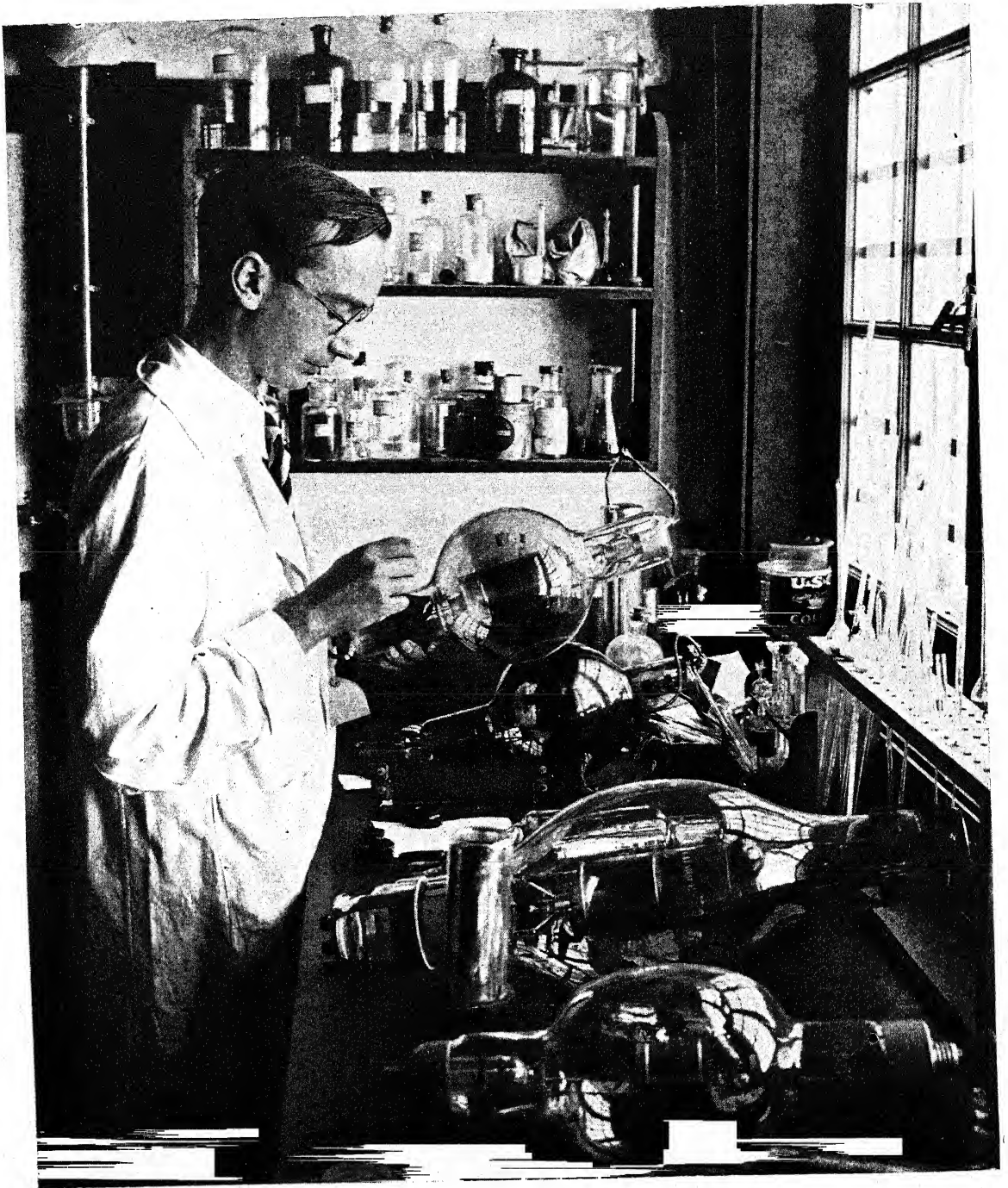
Haifa power house





Reading power house





Repairing radio tubes, Hebrew University

Photo KLUGER

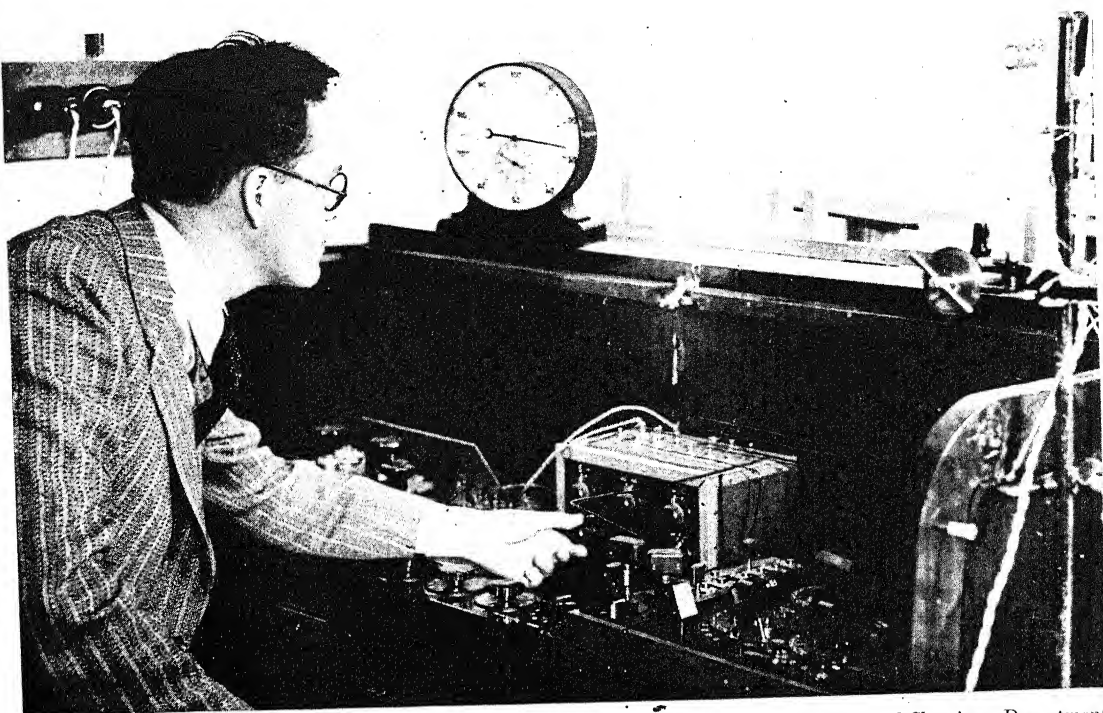


Photo KLUGER

University Physical Chemistry Department

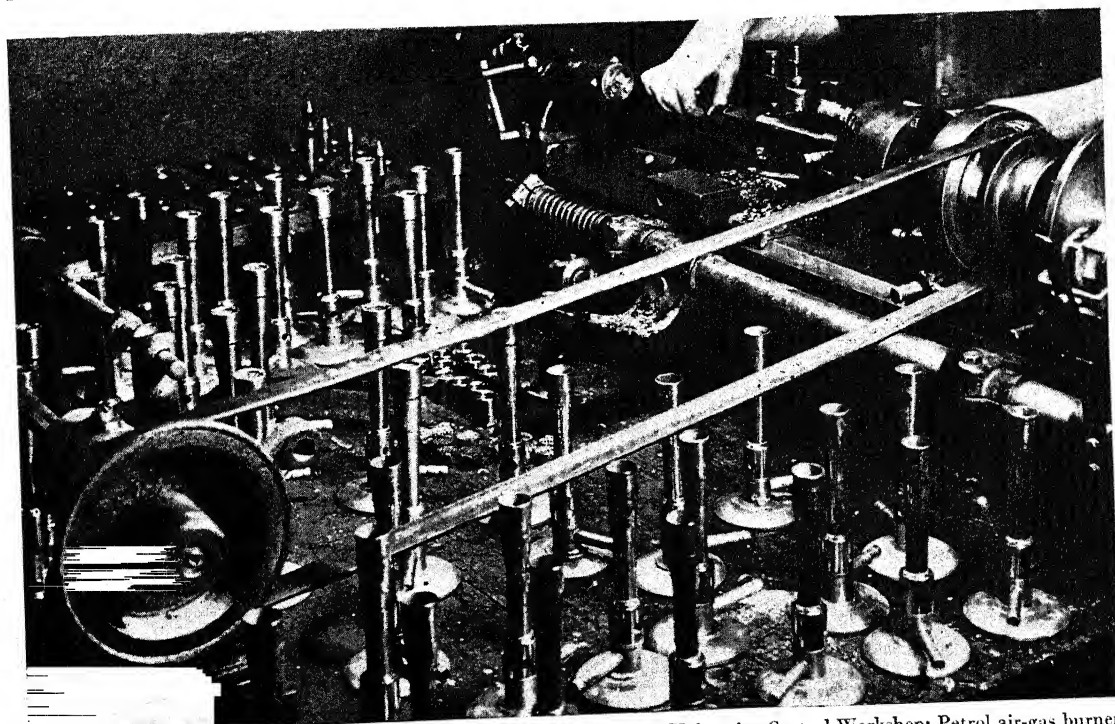


Photo BERNHEIM

University Central Workshop: Petrol air-gas burner



Investigating gas reactions (Dr. Farkas)

*Photo* BERNHEIM



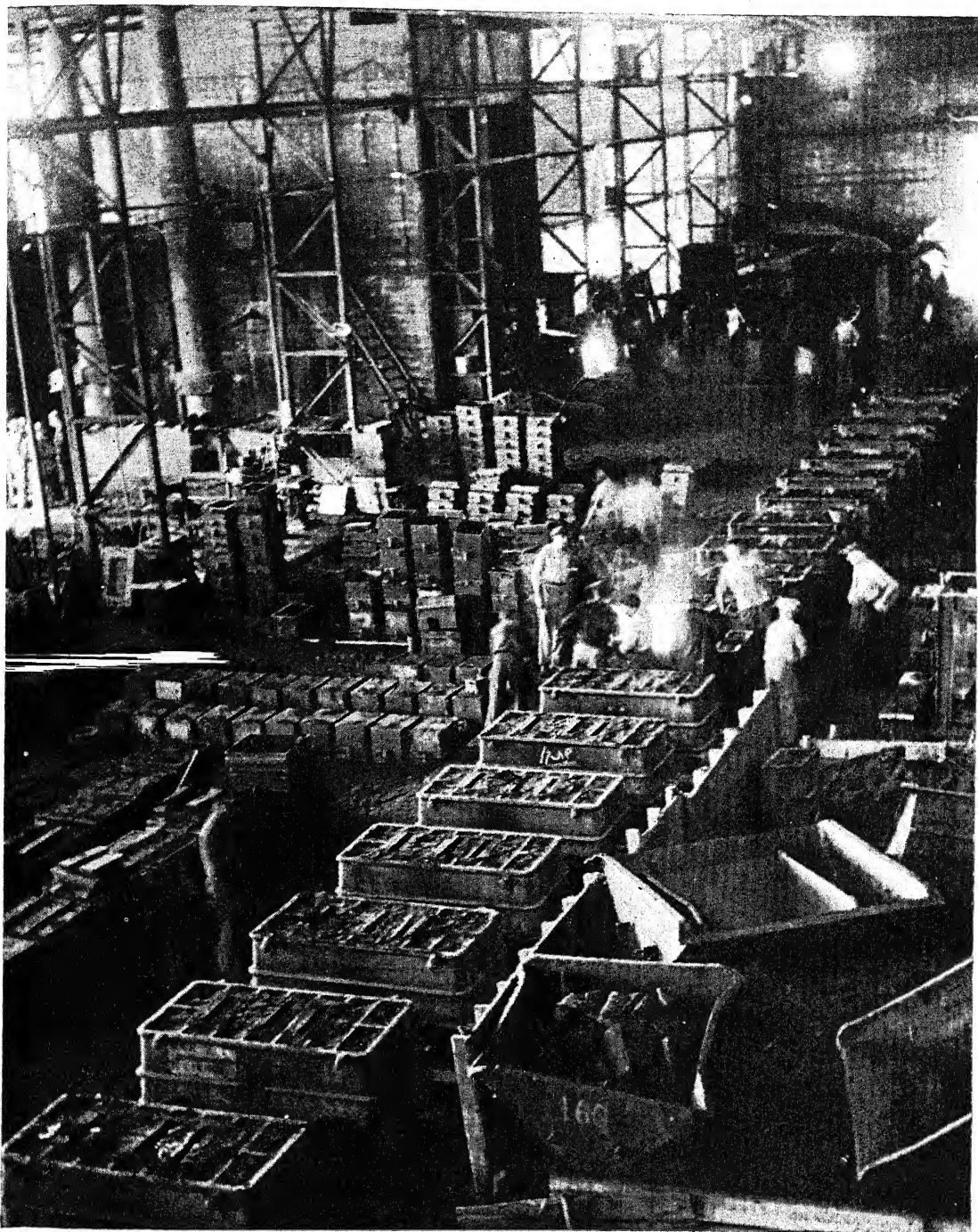
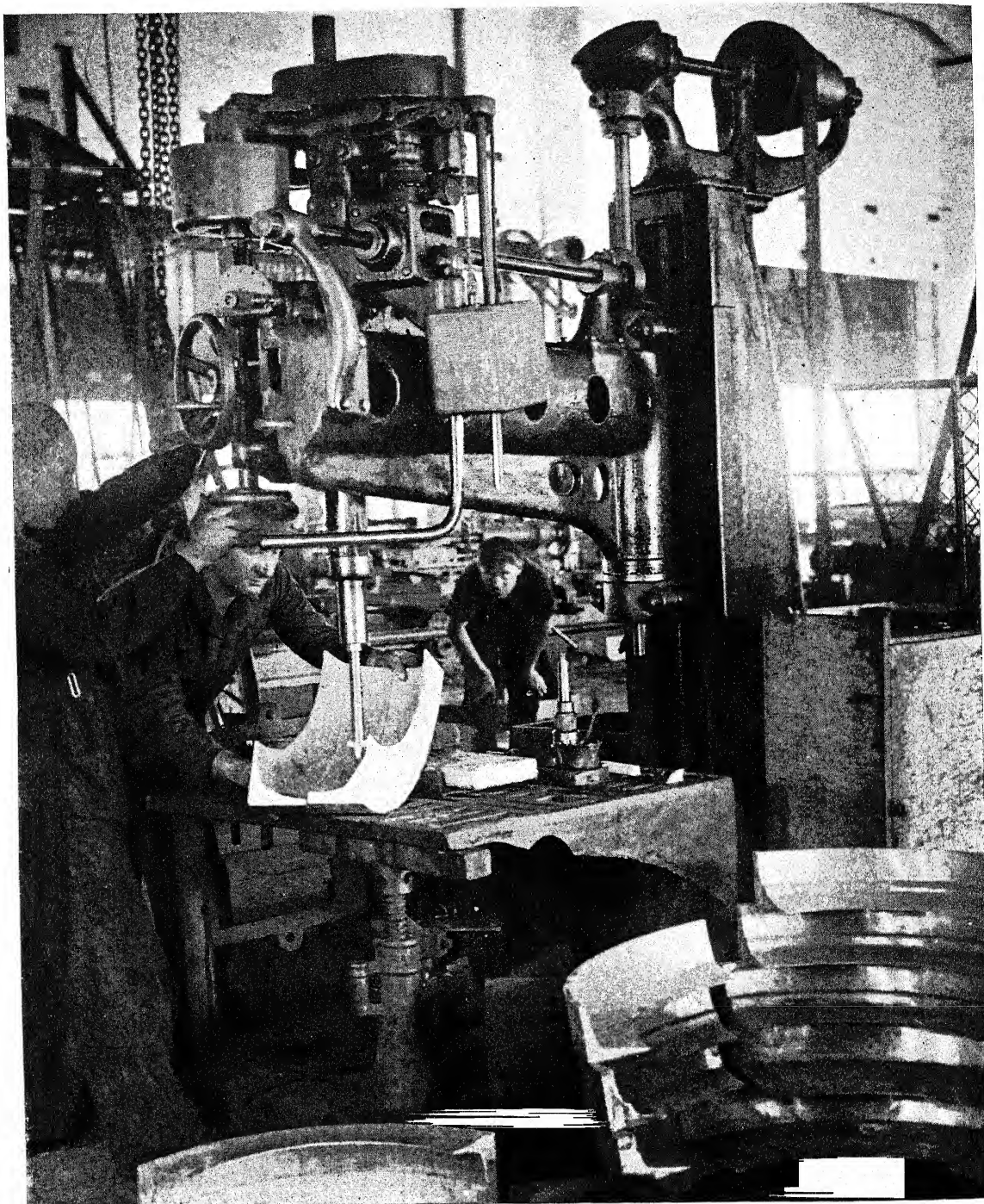


Photo BERNHEIM

Casting bathtubs—"Vulcan" Foundry, Haifa



Co-operative foundry in Tel Aviv

*Photo KEREN HAYESOD*

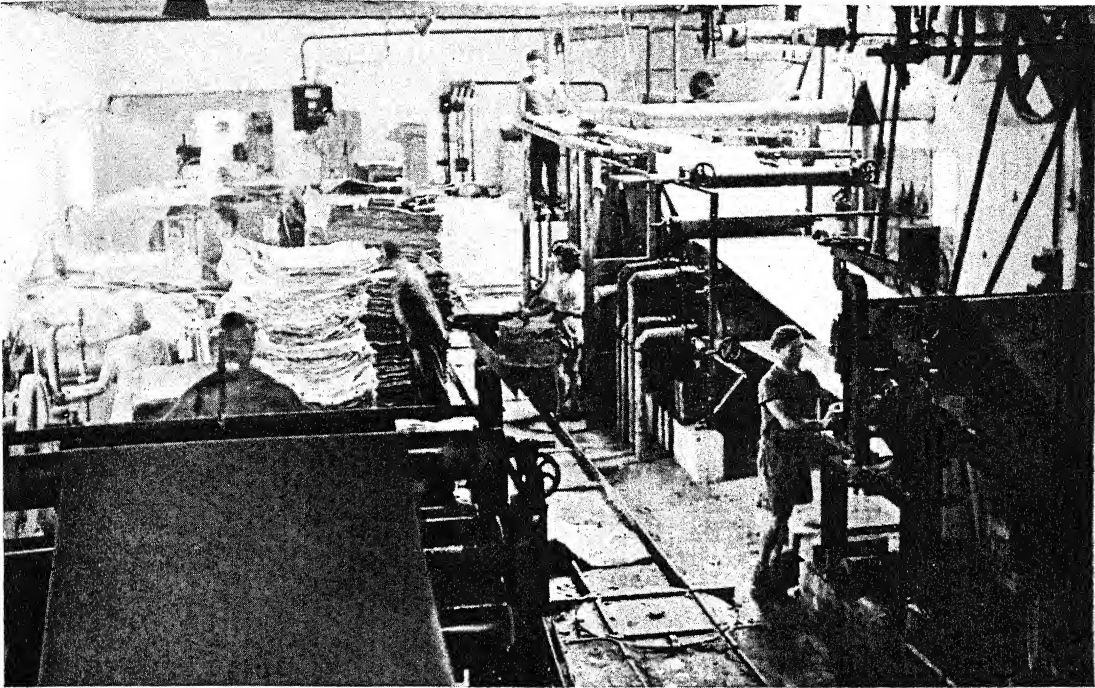


Photo KEREN HAYESOD

Cardboard production: Petach Tikvah

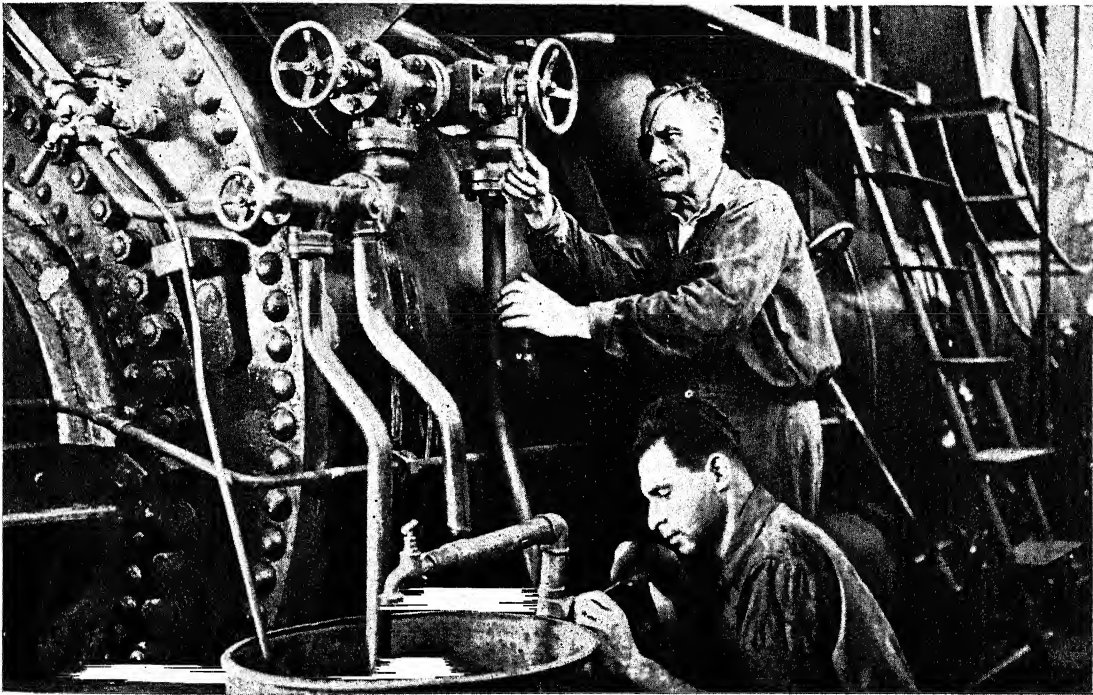
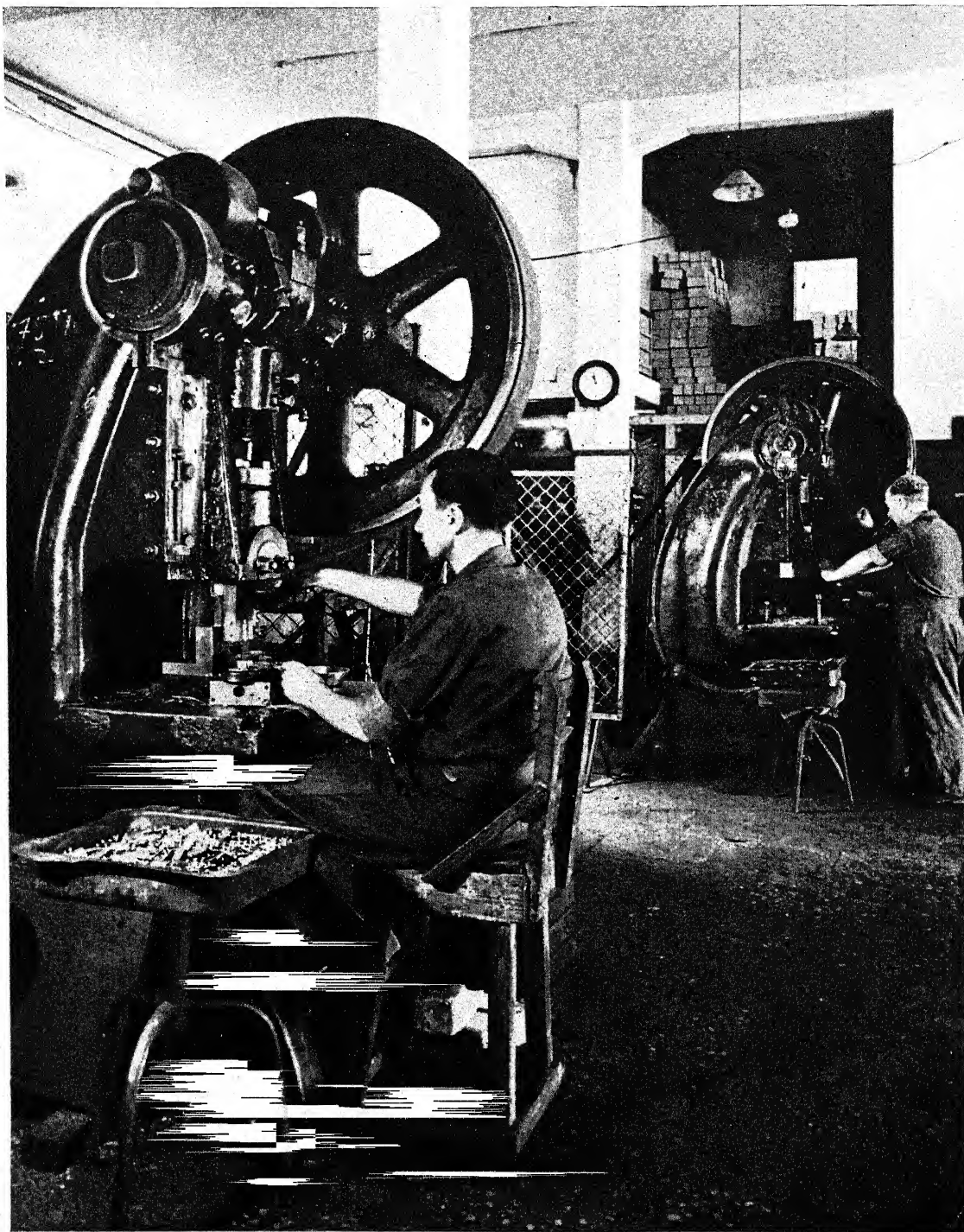


Photo JEWISH AGENCY FOR PALESTINE

In a brick factory





Making safety razors

*Photo* BERNHEIM



Photo KLUGER

Making vegetable crates: Kibbutz Afikim (Jordan Valley)

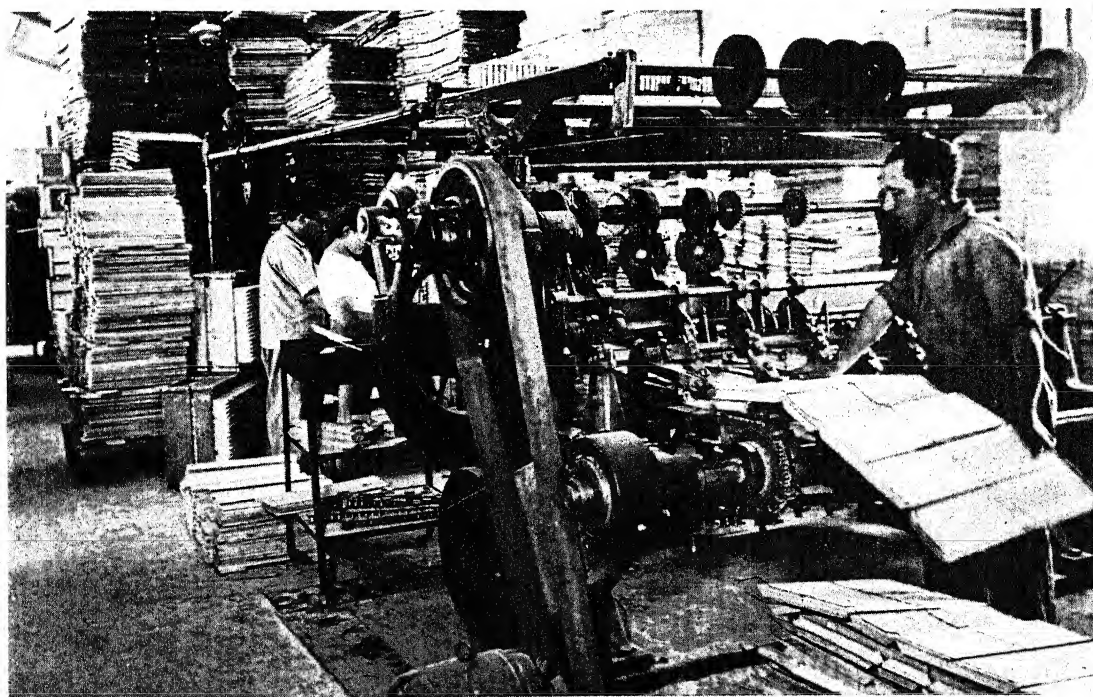
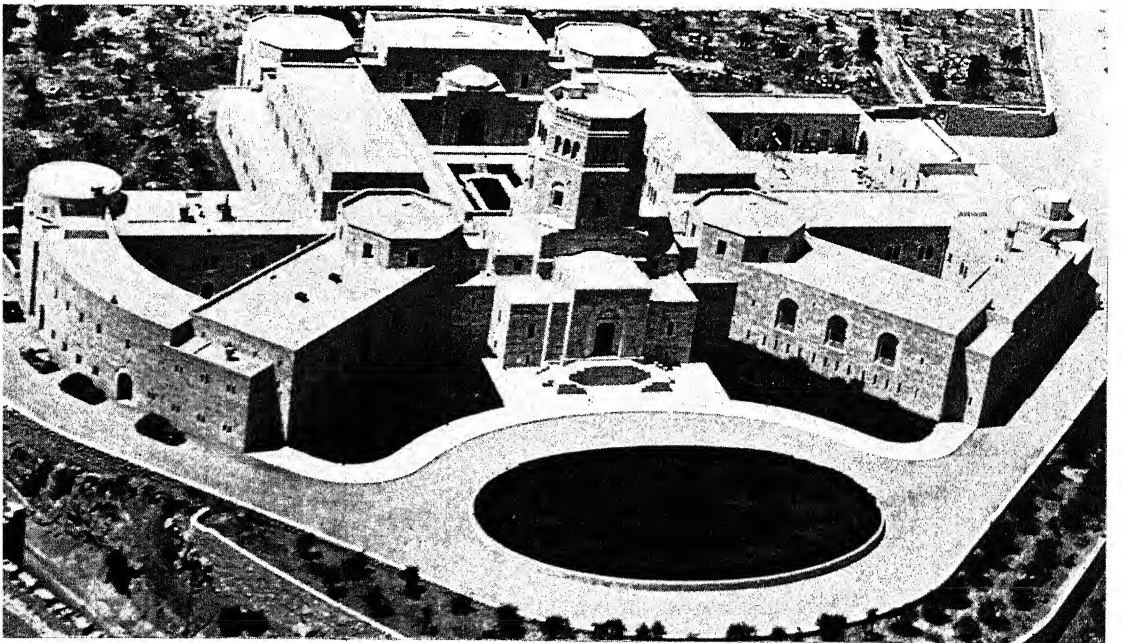


Photo JEWISH AGENCY FOR PALESTINE

Tinned fruit and jam production at Givath Hayim



Police post at Acre



Rockefeller Museum, Jerusalem

*Photo KLUCER*





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New building for old

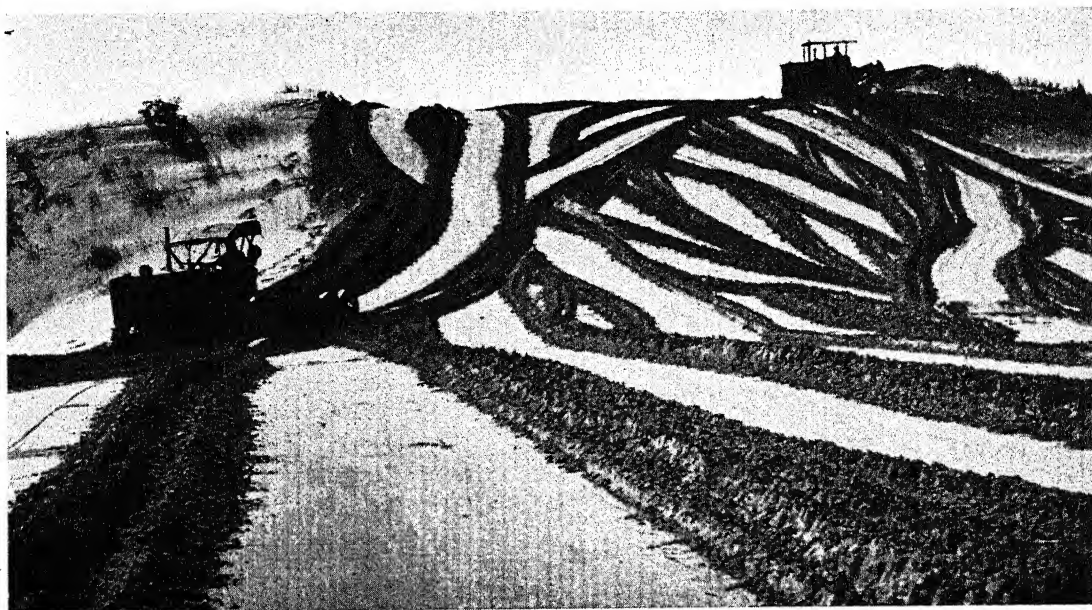


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Planning new suburbs: Tel Aviv



Municipality in the Arab town of Gaza

*Photo* SCHWARZ



Photo HIMMELREICH

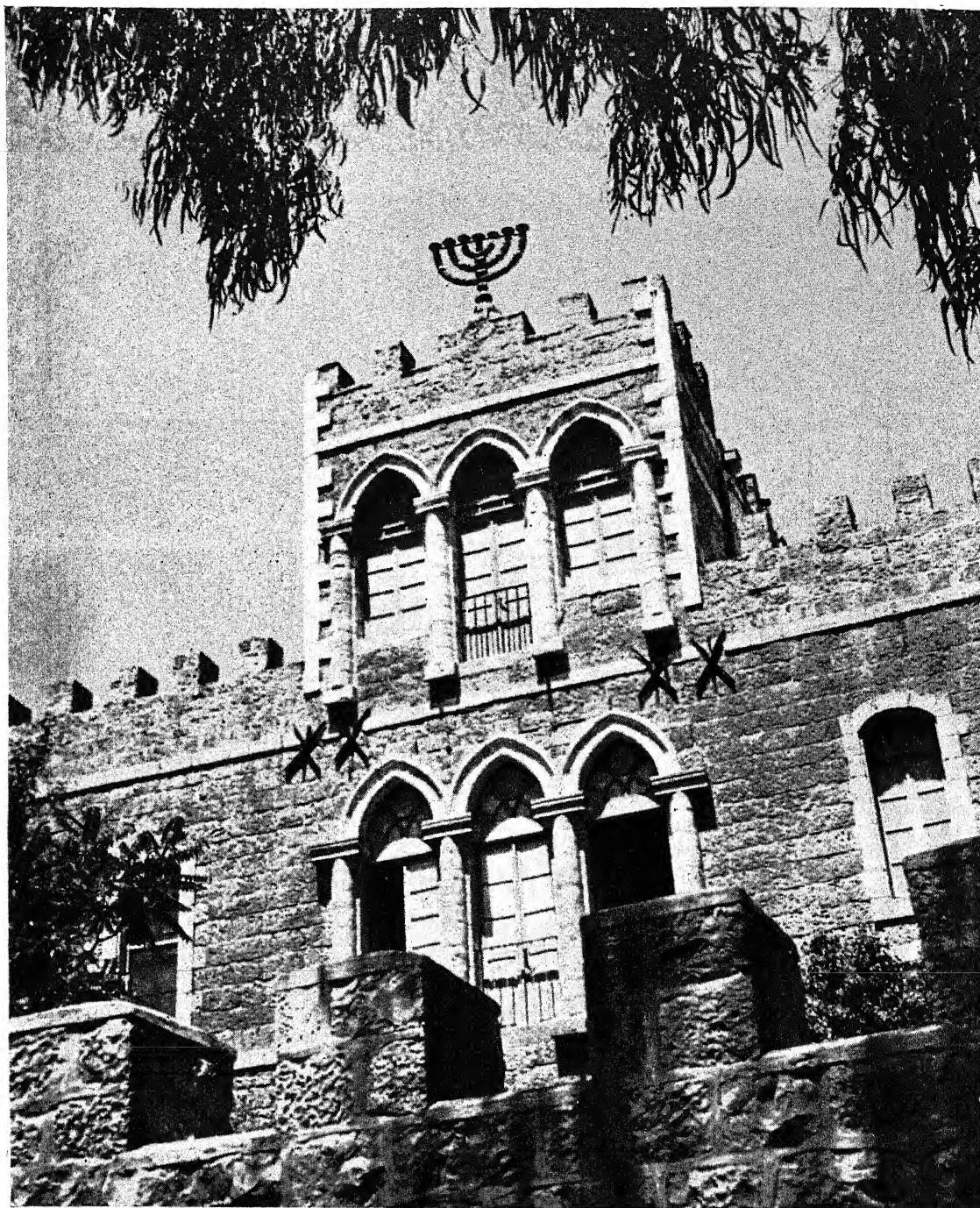
Citrus House, Tel Aviv



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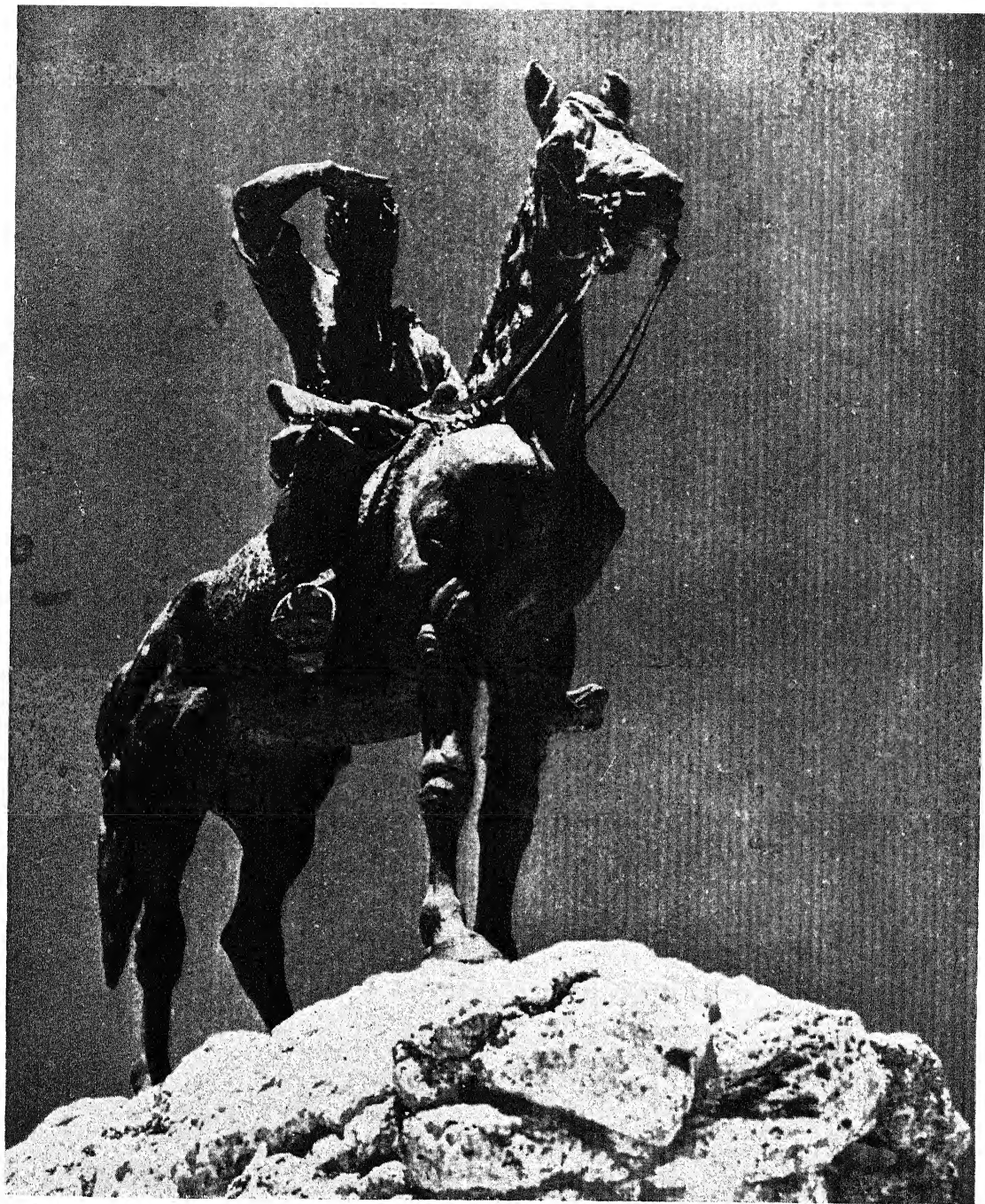
Modern food market, Haifa





Jewish National Museum "Bezalel", Jerusalem

*Photo SCHWARZ*



*Photo* SCHLESINGER

Statue



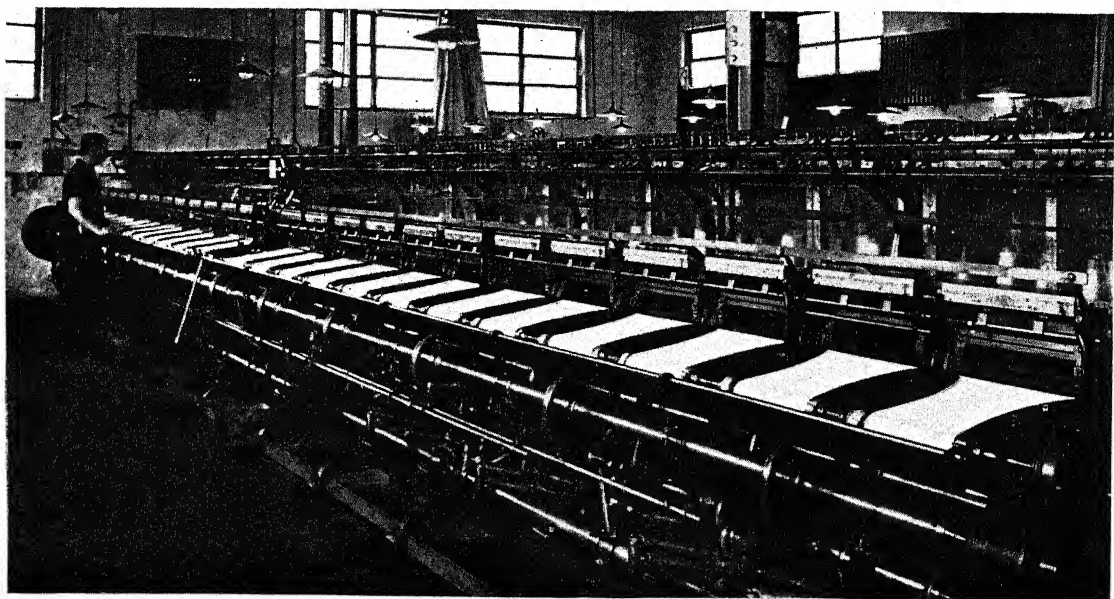
Annual fashion exhibition, Tel Aviv

Photo SCHWARZ



Textile Exhibits

Photo SCHWARZ



Hosiery factory

Photo HIMMELREICH



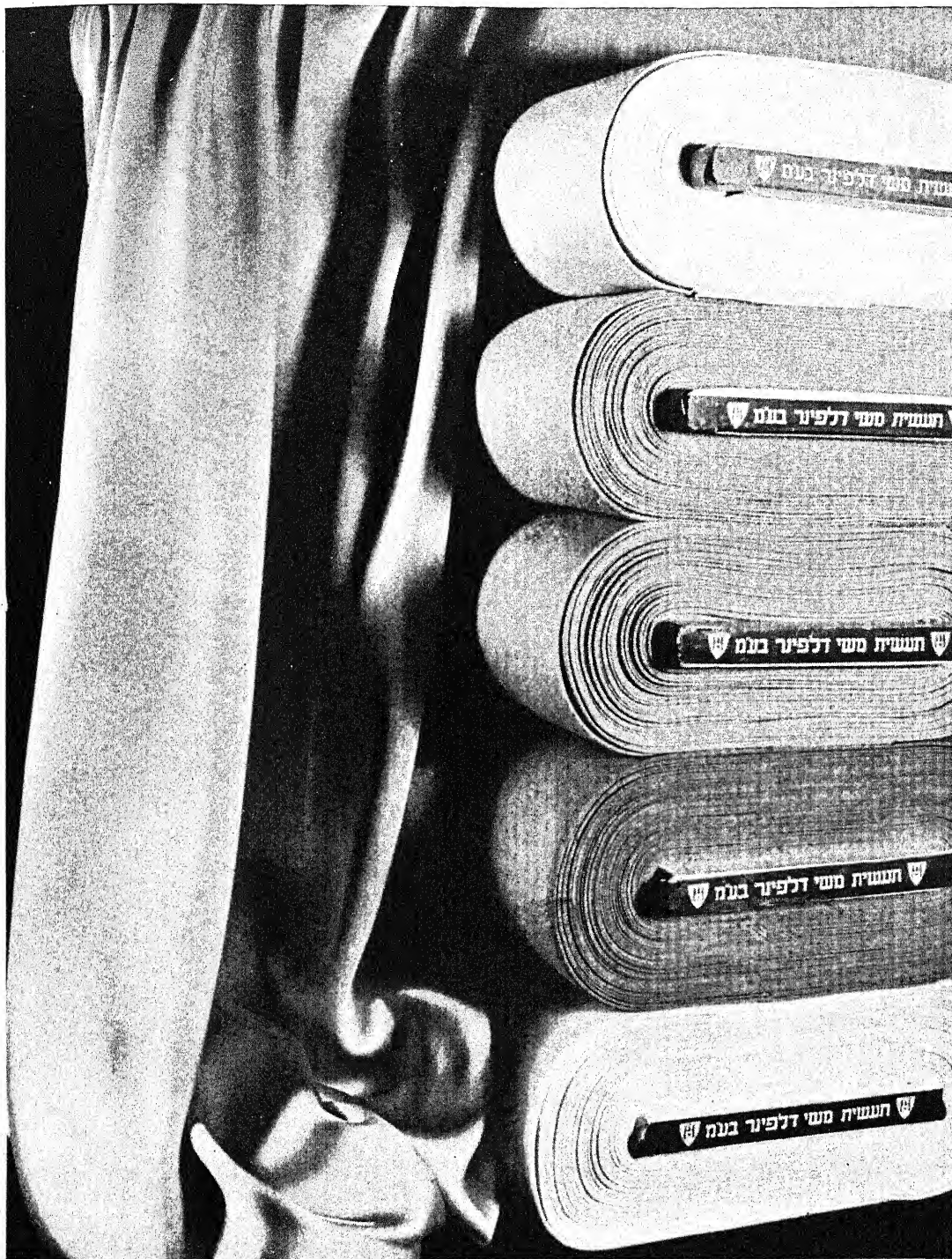
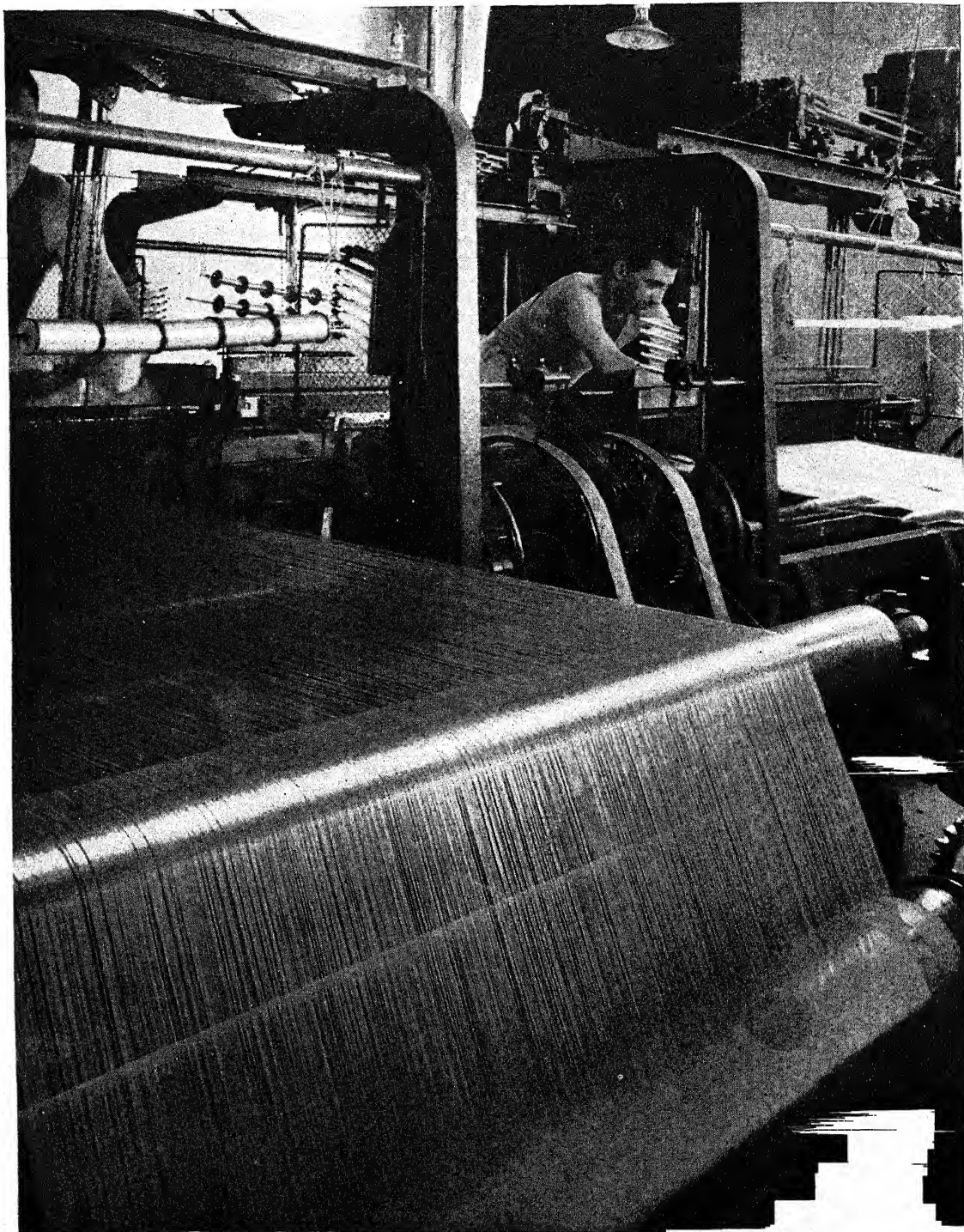


Photo HIMMELREICH

Silk products



Silk loom (Delfiner)

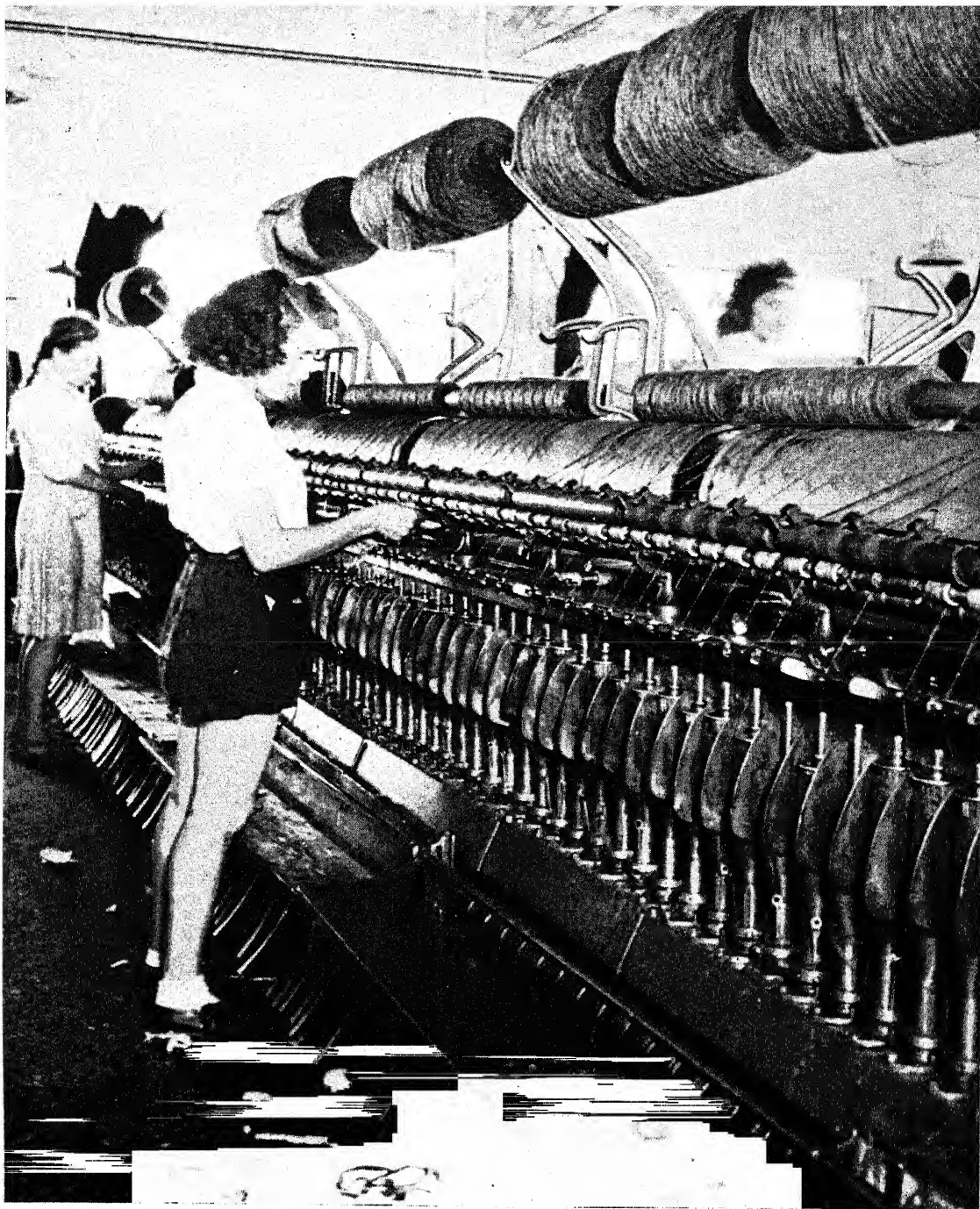
Photo BERNHEIM



Photo BERNHEIM

Spinning section (Klar Ata)





Cotton mills in Gamat-Gan, near Tel Aviv

*Photo SCHWARZ*



Photo BERNHEIM

"Lodzian", hosiery factory



*Photo BERNHEIM*

Spinning section, Kfar Ata



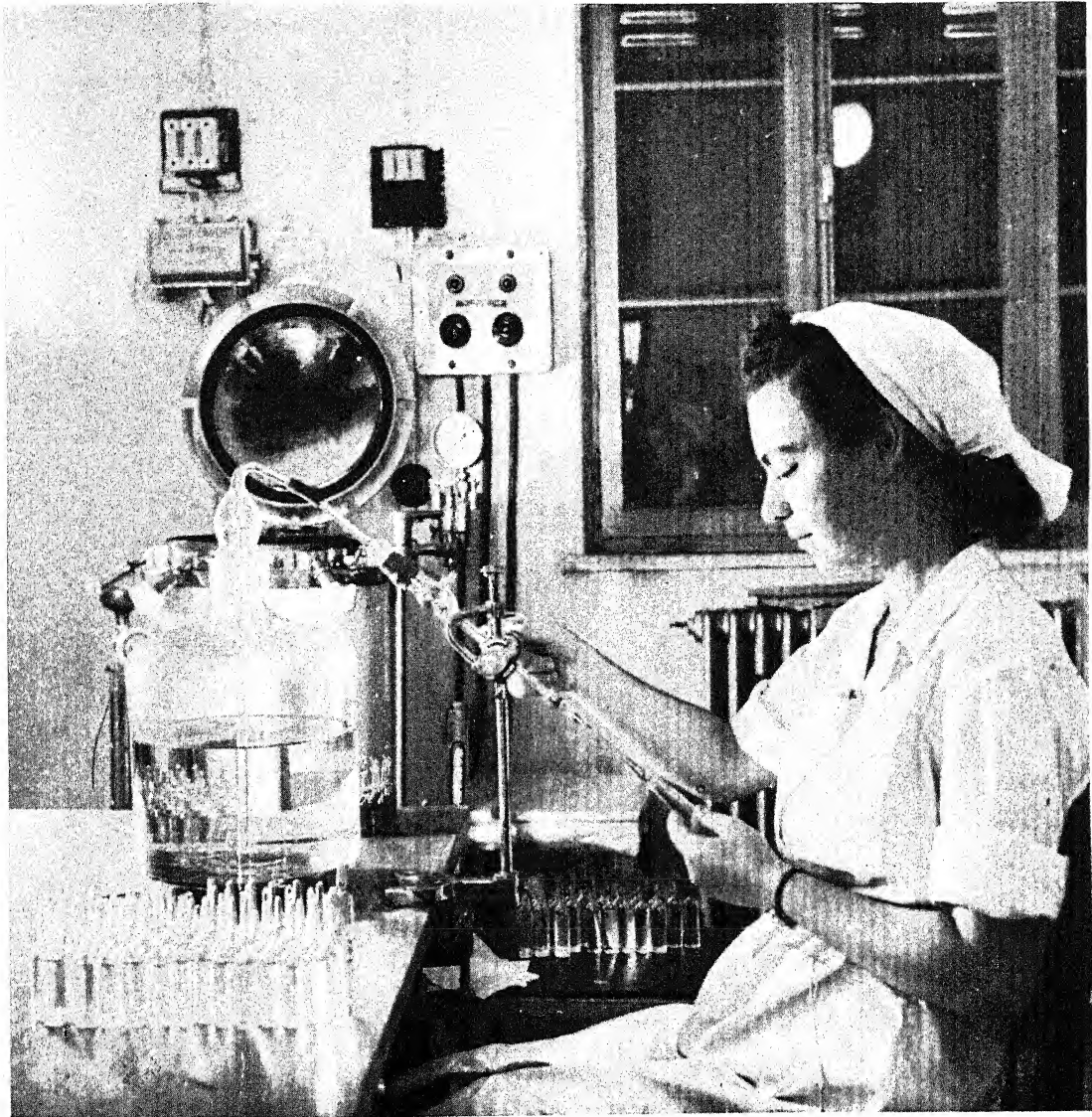
Locally-made textile goods at fashion exhibition, Tel Aviv

*Photo SCHWARZ*



Photo GIDAL

Teva laboratory (Medical plants)





Chemical products

Photo HIMMELREICH



Photo HIMMELREICH

Soap products (Shemen)





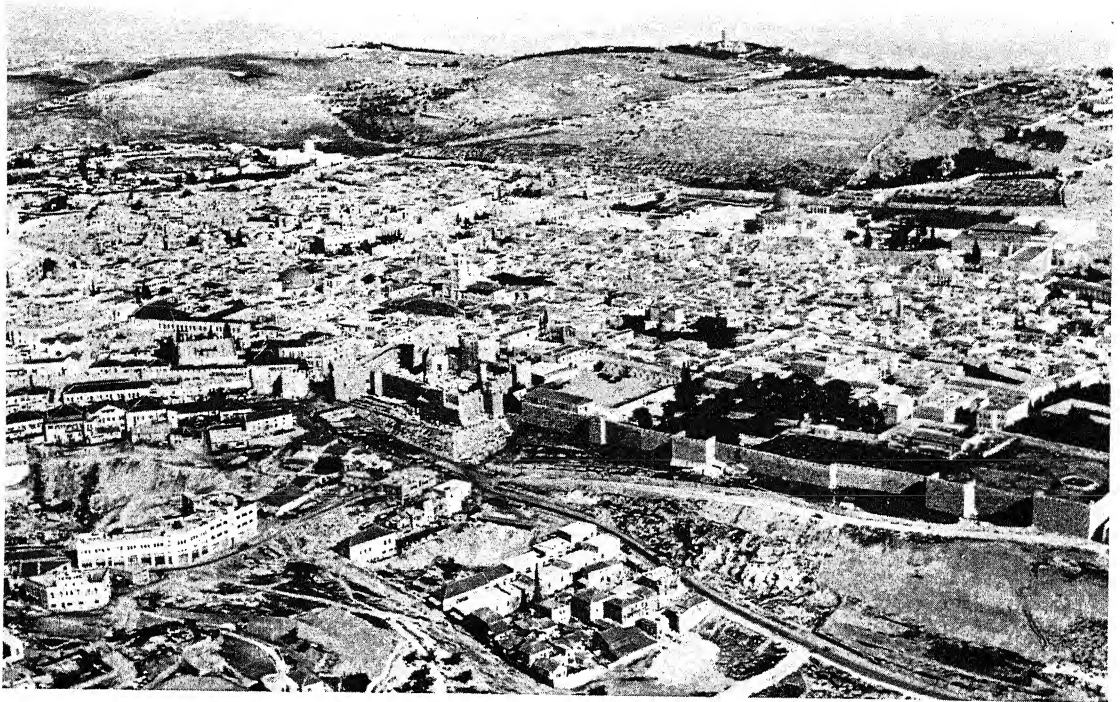
Open-air bath (Tiberias)

*Photo JEWISH AGENCY FOR PALESTINE*



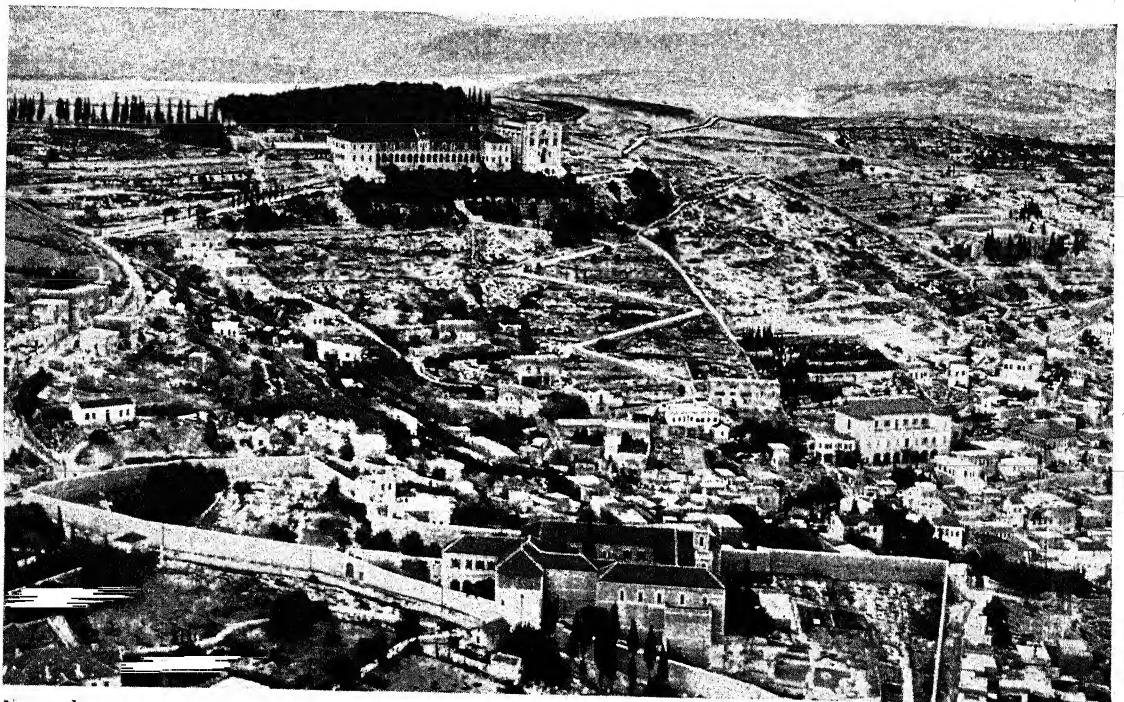
*Photo* JEWISH AGENCY FOR PALESTINE

The Gardens at Tiberias



Jerusalem from the east

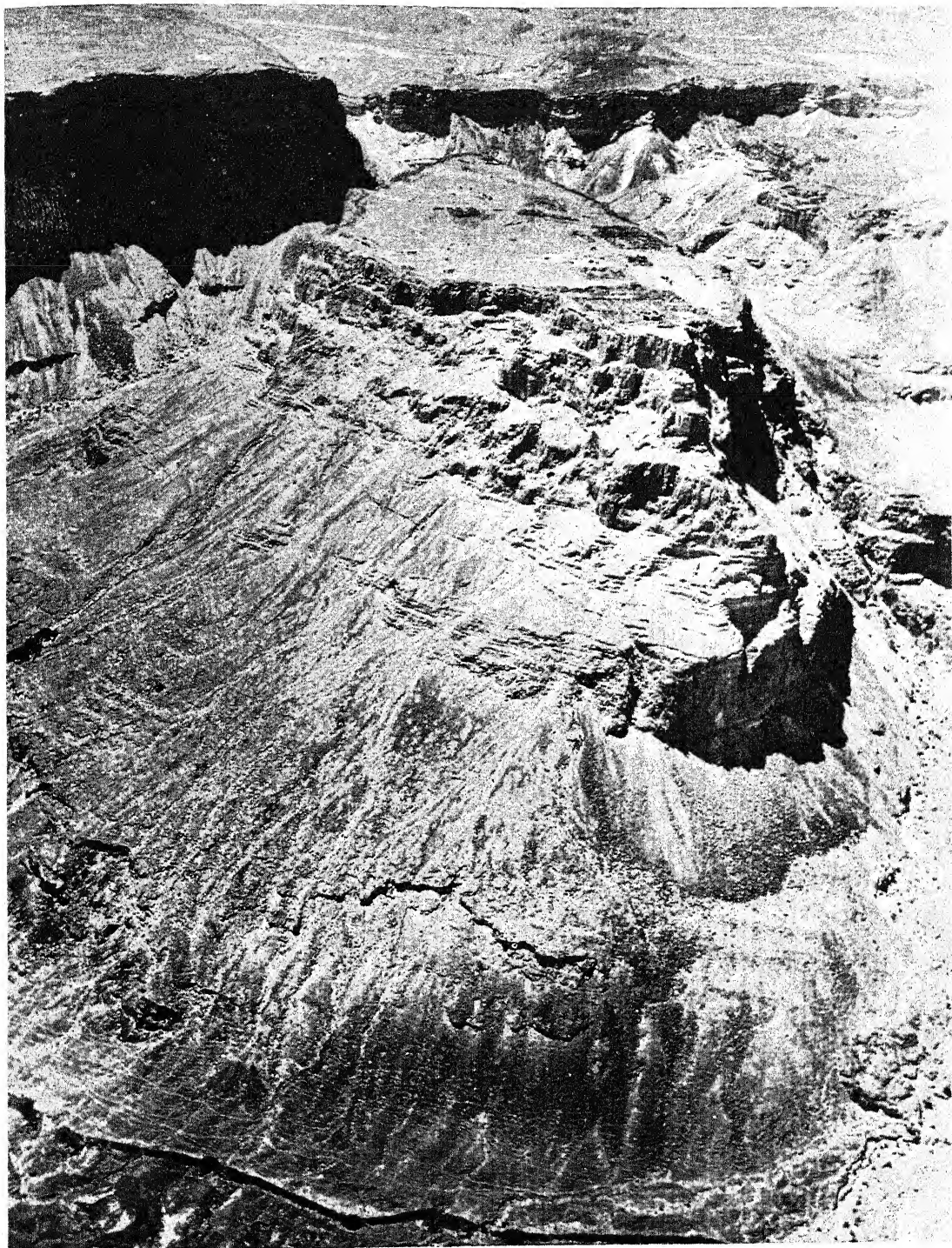
*Photo KLUGER*



Nazareth

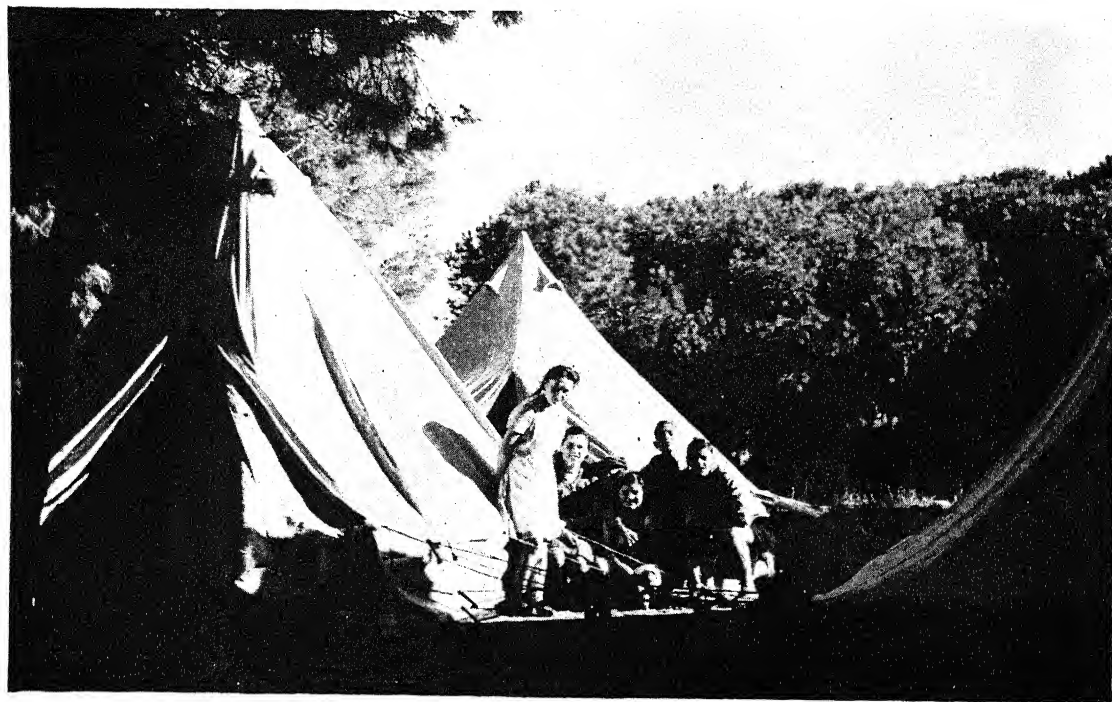
*Photo BLACK STAR*





*Photo* BLACK STAR

Ruins of Masada Fortress



Camping on Mount Carmel

*Photo MEYER*



Capernaum

*Photo KLUGER*



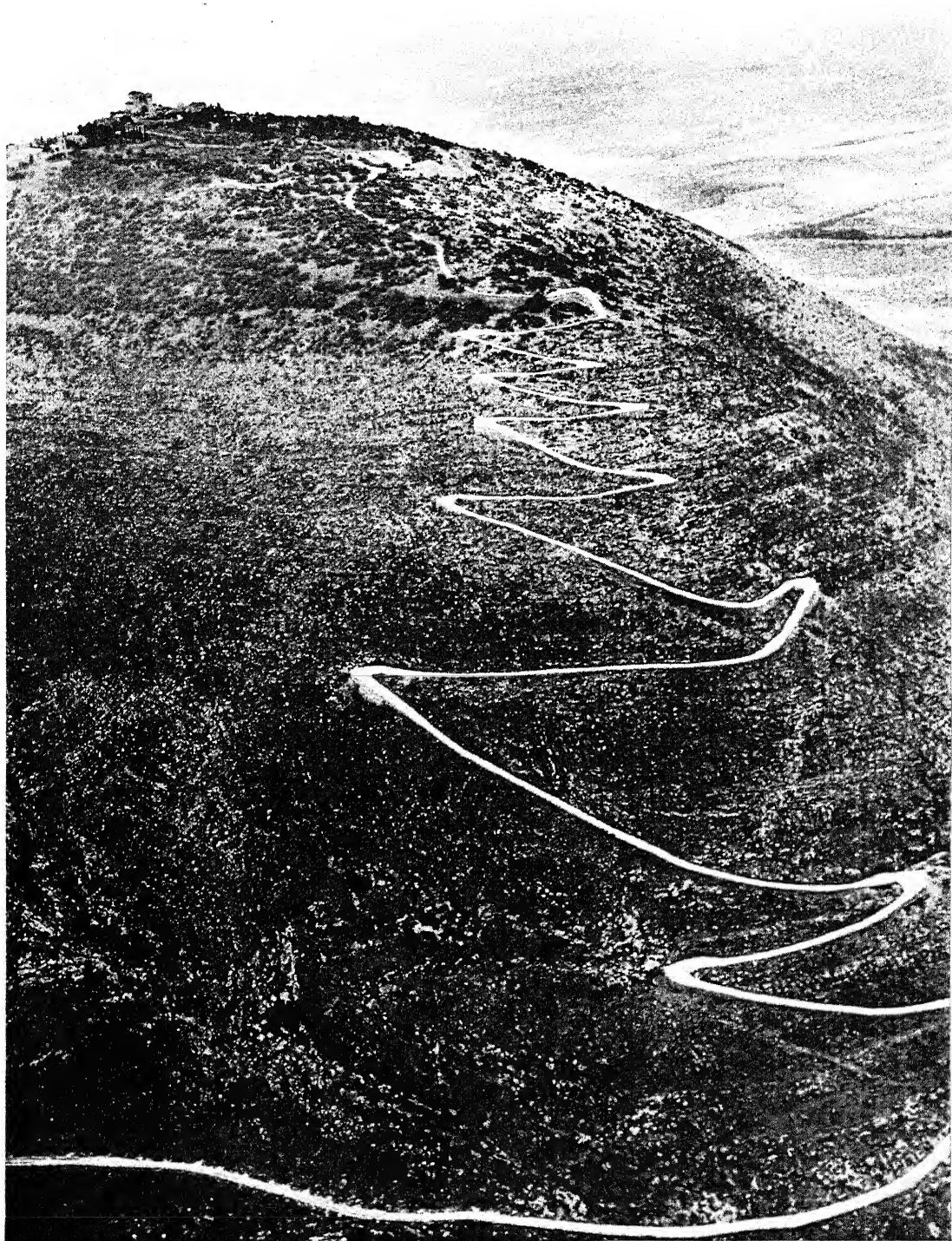


Photo BLACK STAR

Mount Tabor



A coastal vessel off Haifa



Photo KLUGER

Haifa Harbour



Photo KEREN HAYESOD

Jewish coastguard





S.S. Har-Zion, formerly sailing regularly between Haifa and Constanza, sunk by enemy action

*Photo JEWISH AGENCY FOR PALESTINE*



Jewish training ship, "Rahaf"

*Photo JEWISH AGENCY FOR PALESTINE*



*Photo JEWISH AGENCY FOR PALESTINE*

*Young Palestinian in training*





"Victory I" built in Tel Aviv

*Photo KEREN HAYESOD*

## The Electrification of Palestine

The electrification of Palestine is carried out by two large companies: The Palestine Electric Corporation (P.E.C.) and the Jerusalem Electric and Public Service Corporation.

The concession to the Palestine Electric Corporation is limited to a 70-year period, from 1926 onward; the High Commissioner has the power to purchase the company at the end of the 37th year of the concession, and at 10-year intervals thereafter. Thus the first date at which the concession can be purchased is 1963. These stipulations in the concession have a particular influence on the financial decisions of the company, particularly with regard to long term investments in hydro-electric power plants. The Palestine Electric Corporation has the sole right to exploit the Jordan and the Yarmuk for the generation and transmission of electricity outside the Jerusalem area, as well as the right to supply electricity to the Transjordan area. The High Commissioner has been empowered by the concession to supervise financial operations; this includes the maximum amounts to be set aside for amortization of share capital and depreciation reserves. The High Commissioner also has regulatory authority over rate schedules and profits. Since he may call for a revision of rate schedules only every seven years during the first 21 years of the concession, and at five year intervals thereafter, it can be easily understood that his authority is actually not a strong one.

In the history of the two companies, intervention by the High Commissioner has not been frequent. No permanent public utilities commission has been established.

The P.E.C., founded by P. Rutenberg in 1923, is by far the largest concern. It may be called the producer of electrical energy in Palestine, since its field of operation comprises industry, agriculture and residential consumption in all of Palestine outside of Jerusalem. Its directorate is largely British.

The Jerusalem Company, founded in 1929, supplies the City of Jerusalem and its surroundings. Its growth is linked with the industrial and commercial progress of this area during

the last decades of Zionist settlement. Its directorate is also largely British.

The total capacity of the two companies is approximately 89,200 KW about 1,800 KW of which are probably obsolete. Approximately one-fifth of the generating capacity is hydro-electric; the rest is diesel-powered.

Before the foundation of these two electrical concerns, small privately owned units supplied current for the local use of the producer. Small steam and diesel engines were used. The current output was inconsiderable.

However, it is a significant fact that despite the expansion of the P.E.C. during the last two decades throughout the whole of Palestine, numerous small producers of electricity still exist. This fact may be connected in some instances with the rate policy followed by the two large companies.

The growth of electrical power in Palestine has been a rapid one and reflects the economic rise of this country under Zionist immigration —i.e., the growth of agriculture, industry, and commerce which are based upon the firm determination of the Jewish people in Palestine to build a national Jewish homeland and which has resulted in the benefit of the country as a whole. [See Tables II and III (a) (b)].

### Petroleum Oils and Palestine's Electrical Industries.

Since Haifa refineries are connected by a pipeline to the rich oilfields of Iraq, petroleum oils might be expected to be a cheap source of electrical energy besides water power. During the first years of electrification in the 1920's, coal, oil, and wood were the fuels giving rise to electrical energy: at present, oil is the fuel of utmost economic importance.

It is the natural source of energy in Palestine, if we regard it from the viewpoint of low cost of recovery, transportation (by pipeline), and the relative proximity of the refineries at the end of the Haifa pipeline to all Palestine. However, since the operations of the oilfields and of the refineries are controlled by large mono-

polistic concerns, the benefits of location and availability do not make themselves felt for the consumer. Since the costs of transportation of other fuels to Palestine would be far greater than that of Iraq oils, the price policy of the large concerns controlling the output and the distribution of Iraq oils actually determines the cost of this basic fuel in Palestine. It is known to the public that the Palestine Government had stipulated in its convention with the Iraq Petroleum Company in 1931, and with the Anglo-Iranian Co. in 1933, that the "conditions of sale of such petroleum products in the local market will form the subject of an arrangement between the High Commissioner and the Company." However, this agreement did not actually eliminate monopolistic price policies of the companies which had obtained the concession for oil importation into Palestine. The opening of the refinery in Haifa itself in 1940 did not even result in lower petroleum prices. The average wholesale price of fuel oil in Palestine from 1938 to 1941 was 52 per cent higher than in the United States. A report of an official Government of Palestine "Committee on Import Prices" at the beginning of 1945 estimated that in Palestine wholesale prices of fuel oil were 40 per cent. higher than in the United States.

The effects of monopolistic restrictions on the industrial growth of Palestine become still more evident if the retail prices of petrol and kerosene per gallon are compared with those of other countries in the Middle East (See Table I). Also the import prices in Palestine are the highest.

These price differentials are not due to distribution costs but to differences in the intensities of demand: the growing economy of Palestine needs fuel oil in increasing amounts and thus monopolistic importers were and still are in a bargaining position to exact higher prices from Palestine than from any other country of the Middle East without harming the volume of their sales. It is evident that this condition constitutes an impediment to the industrial growth of Palestine in general, and to its electrification in particular. The possibility of a cheap oil supply is at the same time a factor which has to be continuously considered, and which therefore exerts a check on the develop-

ment of hydro-electric power, because the rationality of investments in the latter can not be evaluated with sufficient accuracy under the existing conditions. Thus hydro-electric development is still in its beginnings, and, at present, plants seem profitable only when they fit in with irrigation projects. The only existing hydro-electric plant in Palestine is located at Tel Or at the junction of the Jordan and the Yarmuk rivers; it was completed in 1932, and has a capacity of 18,623 KW. High tension transmission lines connect this plant, working with three turbo generators, with Haifa and Tel Aviv. This plant was foreseen in the projects of Rutenberg when he applied for his concession.

Table I. Oil Prices in the Middle East on or about July 10th, 1939.

(Retail prices per gallon in bulk, *less* customs duties and taxes):—

Source: Adapted from United States Department of Interior, Bureau of Mines, World Retail Prices and Taxes on Gasoline, Kerosene, and Motor Lubricating Oils, Quarterly, September 25, 1939.

Country:	Gasoline		Kerosene	
	in		in	
	Palestine	U.S.	Palestine	U.S.
	mils	cents	mils	cents
Palestine..	33.8	15.8	23.5	11.0
Egypt ..	16.2	7.6	12.0	5.6
Syria ..	21.4	10.0	22.2	10.4
Iraq ..	25.0	11.7	20.5	9.6

#### Growth and Expansion of Electrical Industry.

It may be stated that the electrification of Palestine dates back to the end of World War I. Before this, only small private producers of electricity, such as hotels, motion pictures, etc., working with Diesel engines mainly, produced current for their own use. Public or commercial current producers did not exist. Shortly after the war, two small municipal plants were founded at Nazareth and at Tiberias. The Nazareth station went out of business after a short lifetime; the Tiberias station was taken over by the P.E.C. in 1925. The first large central station, operating with a diesel gener-

ator having a capacity of 1,000 h.p., was completed in 1923 in Tel Aviv. This station, operating under the P.E.C., added four more diesel generators, bringing its total capacity up to 4,476 KW in 1930. In 1925, new stations were built at Haifa (895 KW) and Tiberias (102 KW). With the completion of the above-mentioned hydro-electric plant at Tel Or in 1932, the current supply of Haifa and Tel Aviv could be covered so far that the old thermo-electric plants became merely standby capacity.

However, the growth of demand was so pronounced that two large steam plants had to be built: the plant at Haifa, built in 1937, had a capacity of 30,000 KW.; that at Tel Aviv, built in 1939, had a capacity of 24,000 KW. A small oil plant was recently established in Safed. The Jerusalem Company works with nine diesel engines at a total capacity of 11,000 KW.

Four large industrial concerns produce their own current; three of these are known to produce a total of 10,650 KW.

During the war years generating capacity was not increased in Palestine and all war time changes in transmission and distribution were effected in the interest of national defence. By 1943, the rapidly growing current demand created a serious problem, since it had to be met without additional generating capacity, and it was felt that a supply crisis was imminent. The following figures will illustrate this fact: in 1944, the P.E.C. operated at a maximum load of 57,700 KW, whereas it operated at a maximum load of only 33,900 KW in 1939, its total capacity of 78,000 KW being already partially obsolete. And still there was no shortage of electricity to be felt during the war, a fact which may be attributed to a wise anticipation of demand on the part of the P.E.C. which had led to the building of additional thermal units before the war.

It has been estimated by Palestine engineers that the existing generating capacity is 200 million KWH per annum, assuming a load factor of roughly 30 per cent.; on the same basis, the generating capacity of the Jerusalem Company was estimated at 29 million KWH per annum. Thus the total present generating capacity of Palestine is found to be 229 million KWH per annum.

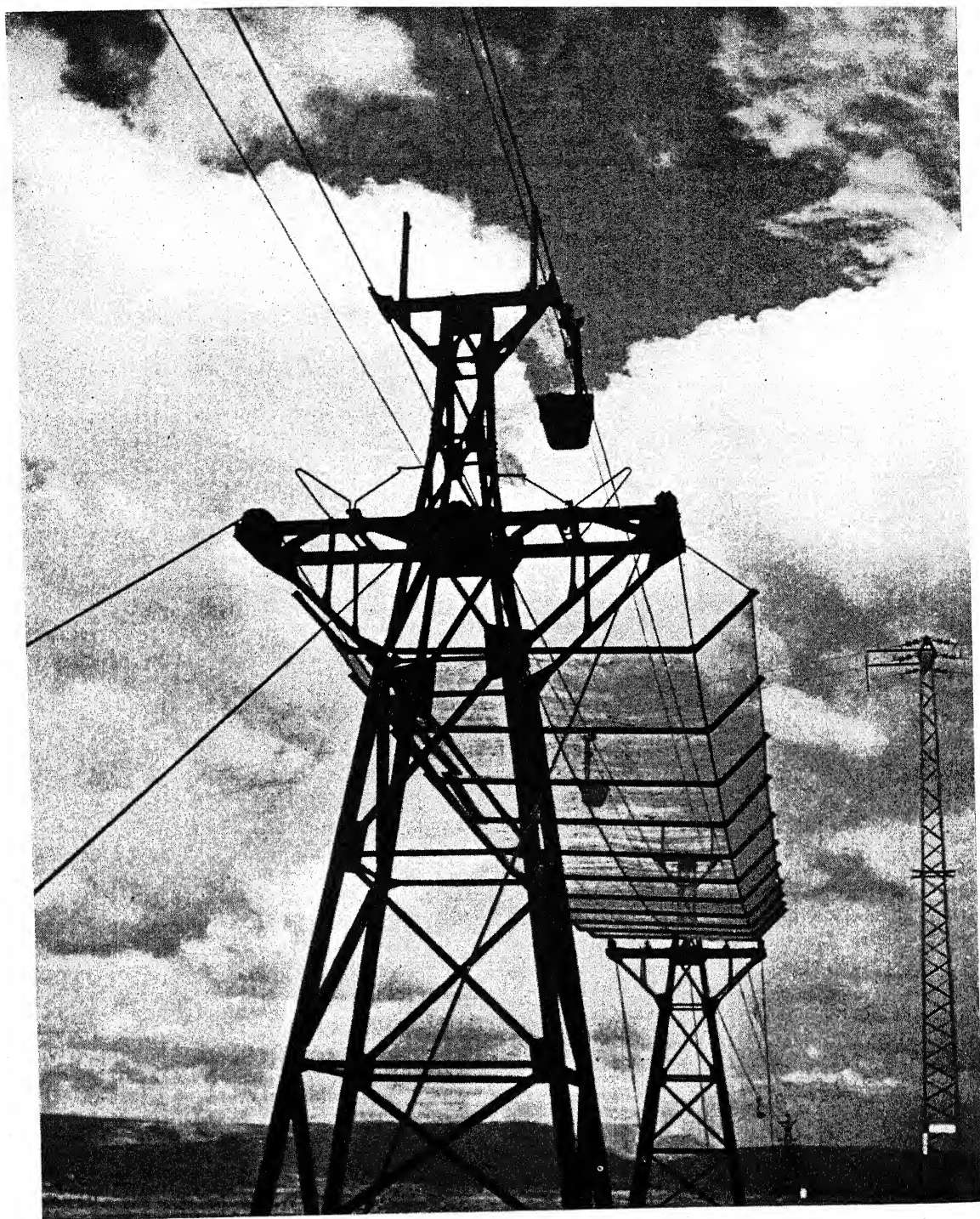
#### Consumption of Electricity. Rates and Costs.

The consumption of electricity in Palestine reflects adequately the rapid development of its economic structure. The following figures will help to illustrate this. The sales of electricity increased from 23 million KWH in 1926, i.e., the year in which the first large plants were set up by the P.E.C., to over 91 million KWH in 1944. While the current consumption increased by 78 times of its original value in the period from 1926 to 1942, the number of consumers increased from 6,500 to 96,000; of these 88,000 are served by the P.E.C. and 8,000 by the Jerusalem Company. These last data indicate that a large part of the increase of consumption is due to increased electrification of homes and commercial establishments.

However, Palestine still lags behind Europe and the United States in the average per capita consumption of electricity. Probably not more than one-third of the houses in Palestine are wired for electricity. This holds particularly true for Arab rural communities in which electrification has made but little progress.

Even though the per capita consumption of electricity in Palestine in 1944 is about one-third of that of Britain in 1935, it is by far the largest in the Middle East.

The figures for the sale of electricity in thousands of KWH (Table II) give an idea of the rapid development of current consumption since the erection of the first power station in Tel Aviv in 1926. As regards the distributional development of consumption, the growth of Palestine agriculture is adequately reflected in the increase of current consumption for irrigation purposes [Table III (b)]. This trend will probably continue as water is drawn in increasing amounts from deeper and deeper strata. Current consumption as a whole appears to be about equally divided, and thus also to have increased at a comparable rate in industry and agriculture. Agricultural consumption shows a slight relative increase due to enhanced irrigation investments. Commercial and residential users, mainly comprising the third group of the classification of Table III (a), also show an increase in current consumption which is comparable to the increase in industry and



"Naaman" Installation at Haifa Bay

*Photo KLUGER*



agriculture, judging from the figures on the total increase in current consumption and the ratios consumed by each category of consumers. Residential consumption is expected to increase further with a rise in living standards and the introduction of electric refrigeration and air conditioning on a broader basis. Also the potentialities of an increased Arab home consumption will play a role in the expansion of current consumption in the decades following World War II.

Table II. Sales of Electricity.  
(Thousands of KWH).

Source: Statistical Abstract, 1943, p. 179;  
1944 figures estimated by Mr. A. Rutenberg.

Year	Total	Palestine Electric Corporation	Jerusalem Electric and Public Service Corporation
1926 ..	2,344	2,344	—
1930 .	6,168	6,168	—
1935 ..	53,670	50,362	3,308
1939 ..	91,475	84,077	7,398
1940 ..	101,388	93,874	7,514
1944 ..	184,000	170,000	14,000

Table III (a). Per cent. Distribution of  
Electricity Sales by Type of Consumer.

Source. Derived from Statistical Abstract,  
1943, p. 179; Data for 1944 estimated by  
Mr. A. Rutenberg.

<i>Palestine Electric Corporation.</i>				
Year	Total	Industry	Irrigation	Other
1930 ..	100	35.5	28 0	36.5
1935 ..	100	34.1	32 0	33.9
1939 ..	100	29 9	33 9	36 2
1944 ..	100	36.6	32 7	30.7

Table III (b). Data on Current Consumption  
for Irrigation.

Source: Published Data of the P.E.C.

Year			KWH used
1930 ..	..	..	1,700,000
1934 ..	..	..	14,300,000
1938 ..	..	..	25,500,000

# INCREASE OF CURRENT CONSUMPTION FOR IRRIGATION DURING THE WAR.

Year			KWH used
1939	..	..	23,600,000
1940	..	..	26,300,000
1941	..	..	33,600,000
1942	.	..	42,400,000
1943	..	..	50,800,000
1944	..	..	58,000,000

## Profits and Reserves.

Since power producing units in Palestine are relatively small if compared with large hydro-electric producers in Europe and the United States, and since the market served by these units is also small, higher costs of production and higher rate levels are to be expected in Palestine than in already highly industrialized countries.

This difference in rate levels was greater in the early stages of the electrification of Palestine than it is at present. In the early stages of the industrialization of Palestine in the 1920's, power rates were more than seven times higher and residential rates roughly three times higher than comparable rates in the United States in 1925. During the early 1930's, rates were gradually lowered as current consumption increased, and in 1937 an average price of 8.6 mils (4.2 cents) per KWH was reached. In the United States the average price per KWH was 2.1 cents in 1937, i.e. just half as much as in Palestine.\*

However this "natural" downward trend of rates did not continue undisturbed. Because no new power plants could be built and increased demand had to be met with partially obsolete equipment, an upward trend in the average current rates was introduced during the war years. In 1940, average rates increased to 7.3 mils (2.9 cents) per KWH and in 1941 the P.E.C. increased its rates by approximately 20 to 25 per cent. for many types of services.

During the war, higher wages and higher fuel costs also had an effect in increasing the costs of production per KWH. The only factor balancing these effects of the war was the higher output of electricity per generating unit, which

\* 1937. 2.024 mils = 1 cent      1940 2.478 mils = 1 cent.

taken by itself, would have resulted in a considerable reduction of costs. As a result, costs did not increase very considerably during the war; the total costs of production per KWH rose from an average of 5.6 mils in 1938 to 6.0 mils in 1942. As can be seen, rates during the war increased in a considerably greater measure than the costs of production; in 1942, 8.6 mils (3.4 cents) was the average price per KWH paid by the Palestine consumer. The rates charged by the P.E.C. and the Jerusalem Company are comparable throughout the period considered; appreciable differentials between the rates of both companies are to be found only during short periods, since a tendency toward mutual rate adjustment seems to have been the policy followed by both companies.

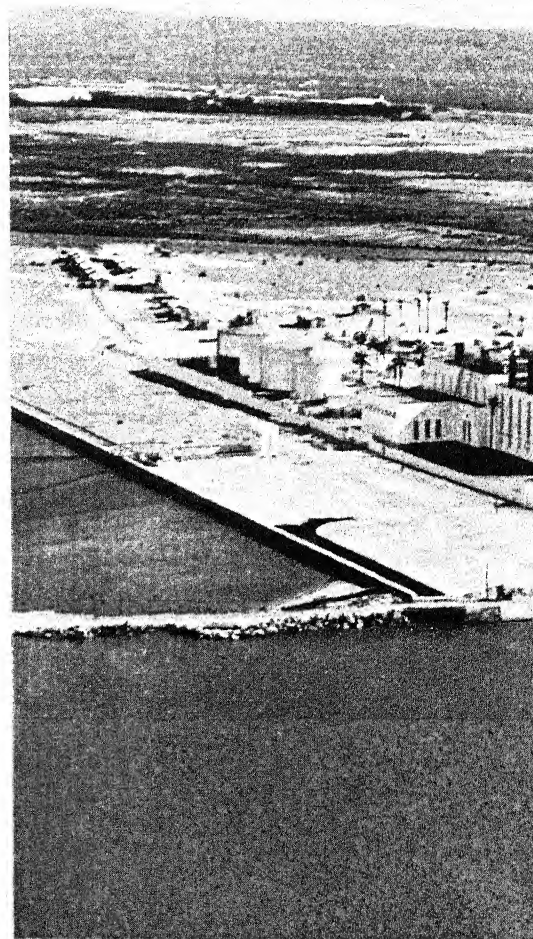
Both large companies have profited considerably from the increasing current demand resulting from the expansion of Palestine economy.

The Jerusalem Company paid low dividends at the start, but for the year ending March 31, 1938, net profits were 8.3 per cent. of share capital, and a dividend of 7 per cent. was declared on ordinary shares.

The P.E.C. started to show good profits from 1930; these were steady except for a small decline from 1938 to 1940, and have resulted in a strong financial position of this company. It seems to have been a fundamental feature of the financial policy of the P.E.C. to counterbalance the uncertainty of the economic situation to which Palestine was particularly exposed shortly before and during World War II with substantial reserves. Depreciation reserves in 1943 amounted to 29.5 per cent. of the fixed plant value. This is extraordinarily high if the fact is considered that the major plants were only four to ten years old. In addition, capital amortization funds amounted to L.P. 497,000 or 18 per cent. of the paid up share in capital. War emergency reserves amounted to L.P. 288,000.

Though the accumulation of these reserves can be understood from the viewpoint of safeguarding the interests of investors through periods of uncertainty, it may still be observed that these reserves are high and indicative of large gains. The question arises at this point whether or not the rate policy of the companies

obstructed, in many instances, the natural tendencies of industrial and agricultural enterprise. Although individual farms and industrial plants are not completely dependent on the P.E.C. and privately owned diesel engines and windmills provide some electricity, it can still be stated that from a social and economic point of view current rates which would completely eliminate



the need of privately owned prime movers would be desirable. In the first place a centralized production is much cheaper by its very nature, and, in the second place, small prime movers are frequently unhygienic, giving off noxious combustion gases, and are often also the cause of accidents. These considerations lead to a serious problem

which not only relates to the electrification of Palestine, but which also touches the future of Palestine as a whole.

#### General Conclusions.

The electrification of Palestine is one of the necessary conditions for a modern economy to



Air View: Palestine Electric Corporation

subsist and to flourish in this country. Besides, there are a number of related problems, such as irrigation, housing, highways, transportation, etc., each of which plays an essential role and upon each of which modern industrial economy depends in an equal degree. All these factors, as well as the electrification of Palestine, must be subject to a legislation which is enacted and administered with the aim of aiding the country as a whole toward a higher level of prosperity and wellbeing, and which is beyond the influence of individual selfish aspirations. Indeed, this problem on which the future of the whole country depends arises even in the discussion of a seemingly technical topic, such as the electrification of Palestine. It seems to me that the best way to discuss the fundamental and essential issues correlated with the electrification of Palestine is to examine the foundation of its electrical industries, since, necessarily, the basic principles involved might be expected to come most clearly to the foreground at the particular historic moment of the foundation of its largest concern, the Palestine Electric Corporation.

The matter of the Rutenberg concession for the electrification of Palestine was submitted by Mr. Churchill to the House of Commons for debate in 1922, and the discussion which followed led Mr. Churchill to make explanations regarding the attitude of the British Government toward the Rutenberg concession which were a question of principle with regard to Palestine itself. It was clear to every member of the House that the matter of this concession closely concerned the future of the mandate and Great Britain's declared policy toward the latter. Mr. Churchill even went so far as to treat the issue as a vote of confidence. The general tenor of Mr. Churchill's argument and policy with regard to the granting of the Rutenberg concession may be found in the following quotations from his speech :

"Broadly speaking, there are two issues raised to-night, and it is very important to keep them distinct. The first is : Are we to keep our pledge to the Zionists made in 1917 to the effect that his Majesty's Government would use their best endeavours to facilitate the achievement of a National Home for the Jewish people ? Are we to keep that pledge or are we to abandon it ? That is the first issue. The second is a separate one, and it is : Are the measures taken by the Colonial Office to fulfil that pledge reasonable and proper measures ?"

"With regard to the larger issue of whether we should or should not repudiate our promise to the Zionists, I venture to suggest the Committee has not the same freedom. No doubt individual Members who have always opposed the Zionist policy—if such there be—are perfectly consistent in opposing it now, but the House, as a whole, has definitely committed itself on more than one occasion to the general proposition that we should use our best endeavours to make good our pledges and facilitate the achievement of a National Home for the Jewish people in Palestine. There never has been any serious challenge to that policy in Parliament."

The electrical industry of Palestine is at present an integral part of its economic structure, which besides its specific technical, financial and economic problems, is dependent on the fate of the country as a whole, and this fate is connected with that of hundreds of thousands of Jewish people inside Palestine who are building up their national home, and indirectly with many thousands of uprooted Jewish people in war-stricken countries who are now unable to think otherwise than in terms of a Jewish National Home.

The statements of Mr. Churchill on the occasion of the Rutenberg concession still apply to the present day issue, of which the electrification of Palestine forms but a part.

## Science and Industry in Palestine

There are still philosophers to-day who hold with Plato (*Republic*, Book VII) that "Science is pursued for the sake of knowledge of what eternally exists," and one of them has gone so far as to suggest that science should be developed without the concurrent development of industry—because science is necessary for the spiritual happiness of mankind while the industrialization of our life is said to have brought in its wake sociological upheaval, discontent and misery.

Whether this statement is true or not, it must be recognized that science and industry have become so thoroughly interlinked that it would be a vain effort to separate them again, and that the application of science to the problems of daily life, especially to those of industry, has wrought irreversible changes in our civilization—changes indeed perhaps more far-reaching than the whole previous development of society. It is even no longer possible to pretend that we can segregate pure research and applied research, the one devoted to the exploration of truth, the other to the advancement of civilization. As a leading American scientist put it, the difference between them is twenty years. The great majority of all important discoveries has come from university laboratories, but the scientist cannot avoid these discoveries being applied in the course of time because of their usefulness. Moreover, the trend of events has swept away the barriers of social caste which existed, and the scientist cannot exclude himself from the day-by-day problems of society; they are no less dignified than the problems of his science. What he can do is to help to create an inter-relationship between science and industry, between the scientist and the community, in which also the dignity of science is safeguarded.

### University Research.

Let us for a moment consider the picture of these relations as it presents itself to-day. The source of all scientific work is still the university, because it forms the scientific worker. The university has to give the student not only the

knowledge and technique which is required in the laboratory and in industry, but also the right intellectual attitude and social consciousness. In the universities, therefore, one finds a place in which scientific research is applied because of its intrinsic value and not because of its applicability. But it is no longer the case that this type of research is limited to the universities. The so-called industrial research laboratories have recognized that research conducted for a narrowly-defined end is sterile, and one will find in the publications of such industrial laboratories a surprising amount of fundamental research.

It is rather interesting to observe, and it is particularly interesting from the point of view of Palestine, that two types of "applied research" laboratories have emerged from the development of the last years. The great companies have established their own laboratories, usually very large and surpassing in size and scope the university laboratories. However, they do not service the much larger number of small enterprises which are equally necessary to the organization of the community life, but which cannot afford each its own research team or for which such research team would not be sizeable enough to be efficient. In these cases, which equally involve industry and modern agriculture, either co-operative laboratories have been established or Government has stepped into the breach. A good example are the Regional Laboratories which the American Government has established all over the United States, and where the problems are studied which are specific for the area: the results are available to all interested parties and this constitutes the fundamental sociological difference between these laboratories and those of the big industrial companies. Especially during the War, government-sponsored laboratory work became one of the prerequisites of the national effort. It is significant to study the expenditure devoted in the national budgets to research. Professor J. D. Bernal in his book *The Social Function of Science* has collected some statistical material on this point. As an example, it has been



estimated that in the United States, in 1940, 300 million dollars were spent on research, and undoubtedly the figure has been very much higher in the ensuing years.

#### Scientific Man-Power.

Palestine has followed a similar development, but compressed into a shorter period, and rather out of a worship for learning which is an inherent trait in the Jewish character, than out of a correct evaluation and recognition of the importance of science. Early in the history of the new Jewish Palestine, which had begun with agriculture and developed quickly into a more industrial community, the Hebrew University was founded, which, helped by the Hebrew Technicum in Haifa and by an influx of experts from Europe, has established the scientific background necessary for any technological development. With the discontinuation of immigration of experts, the task of these two institutions has become even more important; Palestine will have to become self-supporting as far as scientific manpower is concerned. During the war, local industry absorbed hundreds of graduates from the Hebrew University and the Hebrew Technical College. Even undergraduates were taken up by the industry, and Palestine helped also the neighbouring countries to overcome their shortage in scientific manpower. These young graduates, if given proper technical training, proved to be superior in their task to those coming from abroad, since they were familiar with the languages of the Near East and the mentality of its population, and more adaptable to climatic conditions. It is, however, already evident that the teaching potential of our country will not be adequate to the needs of the future. Our teaching staff is too small in number, there is no sufficient laboratory space, and there are no modern teaching facilities. This deficiency, due mostly to the fact that our institutions are very young, has been accentuated by the war, when their links with the scientific world abroad were cut off, so that they could not keep pace with all the advances of the last few years. It is therefore one of our first and most urgent tasks to bring tuition again up to Western standards.

Only a few of the industrial concerns in Palestine

can maintain their own research laboratories, such as the Palestine Potash Company and the Nesher Concrete Factory, and so the co-operative scientific effort, which was to help all the other interested parties, has become perhaps more important here and more quickly so, than in most other countries. The Agricultural Research Station of the Jewish Agency and the Daniel Sieff Research Institute have been founded with the intention of providing the sound scientific basis for the development of agriculture and industry; and it can be said that, in their still young history, they have successfully tried to preserve the long-range view which is necessary for scientific research.

Especially has the war led to the creation of government-sponsored scientific institutions. Immediately after the outbreak of the war many scientists and scientific institutions offered their services to the authorities. Government accepted their offers by establishing a Scientific Advisory Committee of the War Supply Board early in 1942. The Committee was composed of the representatives of the Hebrew University, the Hebrew Technical Institute, the Agricultural Research Station of the Jewish Agency, and the Daniel Sieff Research Institute, the President of the University being the Chairman. In the summer of the same year, when German troops stood on Egyptian soil, the Middle East Supply Centre called upon the Committee for the solution of urgent supply problems. More than 100 questions were considered and turned over to the appropriate institutes for investigation. The scope of the Committee's activities comprised, e.g. agriculture, chemistry, civil and electrical engineering, food, medicine, textiles, and leather. Numerous inventions submitted by the public or by the authorities were also examined, and information on technical and scientific questions was given to Government and the Army.

Courses initiated by Government for vocational training in glass blowing and instrument making are being held under the auspices of the Scientific Advisory Committee.

Upon the recommendation of the Scientific Advisory Committee, and in order to give science fuller opportunity of placing its resources at the disposal of the war effort and of the community generally, the Committee is now

suspended by a "Palestine Board for Scientific and Industrial Research" comprising representatives of Government, of the scientific institutions, and of Industry. Its task is "to receive and consider proposals for the carrying out of scientific and technical investigations which have as their object the furtherance of the war effort or the development or improvement of the agriculture, industry, and commerce in Palestine or the health and welfare of the country and its population."

Governmental participation in the Board is in line with the world-wide trend of organizing the systematic utilization of scientific manpower. Official recognition of the importance of science for industry has found expression also in the recent creation of a Standards Institute of Palestine, a joint undertaking of Government, the Jewish Agency, the Association of Engineers and Architects, the Municipal Corporation of Tel Aviv, the Manufacturers' Association, and the Industrial Council. Its General Council includes also representatives of the scientific institutions. The objects of the Institute are, *inter alia*, the publication of standard specifications of industrial products and materials, the testing of commodities which have been made the subject of standard specifications, and the control testing of commodities not standardized so far. Another of its aims is the promotion of scientific research in relation to standardization and the properties of materials.

#### Industrial Application.

In the following section, four examples will be given in order to demonstrate the influence scientific research and the above-mentioned scientific institutions have exercised upon the development of the country. Completeness is not intended, but the other papers in this book will provide the additional evidence.

Perhaps no other branch of production is so dependent upon scientific research as the chemical industry. Among Palestine's greatest chemical enterprises, the Palestine Potash Ltd., which developed during the 15 years of its existence into an undertaking of world reputation, is an outstanding example of the successful application of the findings of systematic research to practical problems. Based on extensive

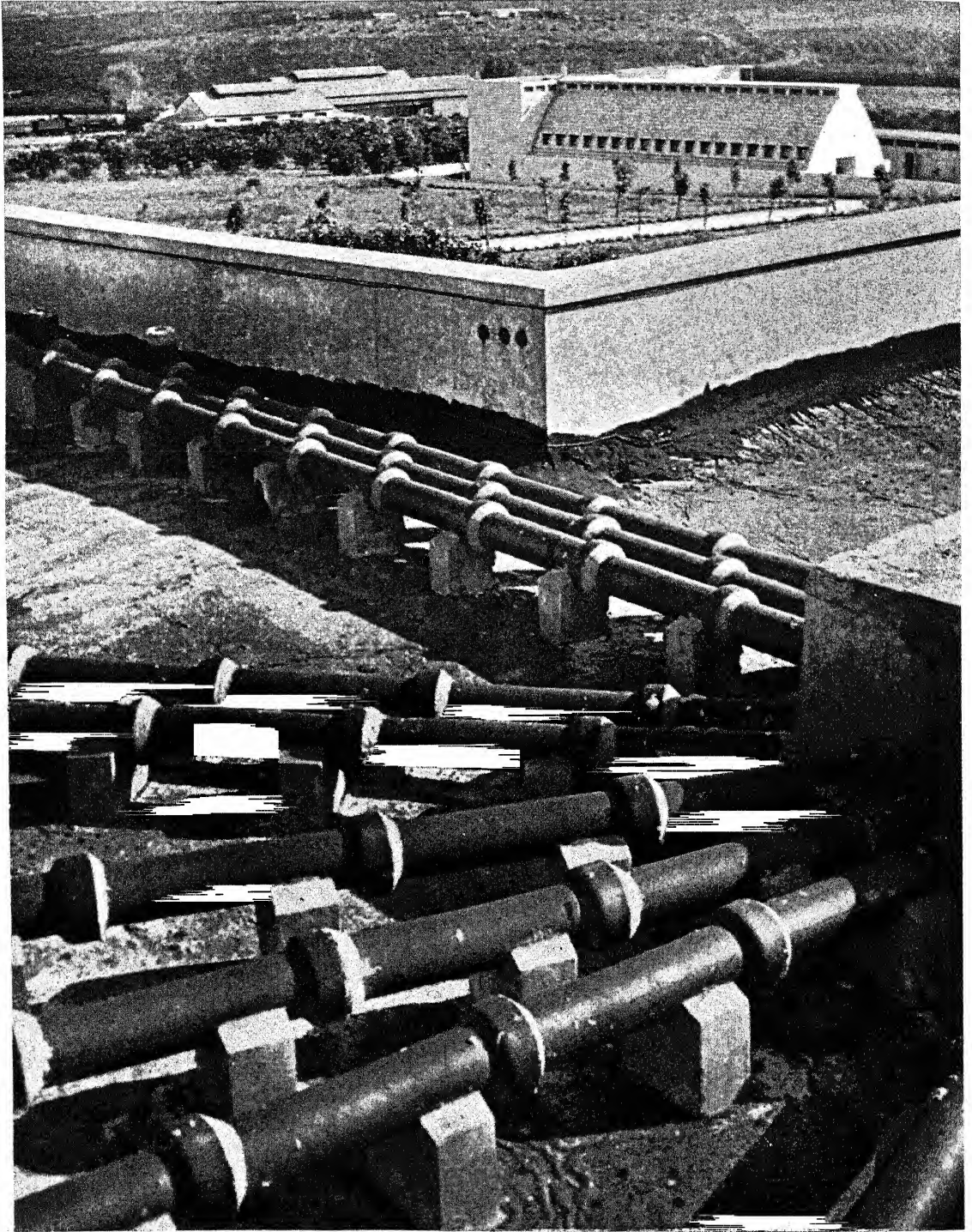
research on the composition of the Dead Sea brine and on the crystallization of the various salts contained therein, the separation of the salts in marketable form is now being carried out. The evaporation process is carried out with the help of solar energy. The methods and problems of extraction and separation of the Dead Sea salts are being studied further, and the results forecast a wider range of utilization of these most important natural resources of the country.

There is close collaboration between the Company and the scientific institutions. In various departments of the Hebrew University, problems of a more general character have been dealt with, and this co-operation brought a number of research projects to a successful practical conclusion. Mention should be made of the methods for the utilization of bromine, in the production of ethylene dibromide for grain fumigation, which was developed at the Hebrew University, and in various other manufacturing processes which were worked out at the Sieff Institute. In the Sieff Institute, too, the bacteria, algae and protozoa living in the Dead Sea, are being studied, a problem—for the moment—of more theoretical interest.

An interesting example of the role the Hebrew University is playing in training young chemists, is the fact that about 50 per cent. of the junior research staff of the Palestine Potash Company have graduated from the Hebrew University.

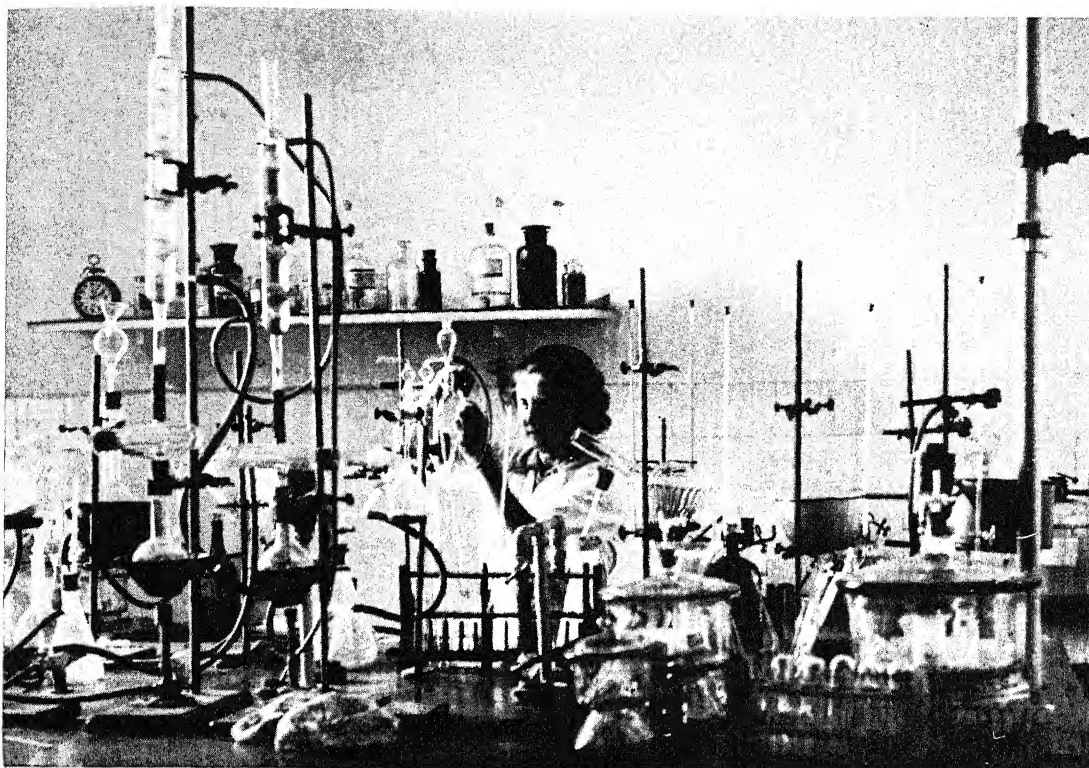
#### Chemical Industry.

Palestine's industry consists in its greatest part of a large number of relatively small enterprises. This is the reason why, at the outbreak of the war, the local chemical industry was in no way organized to meet the demands for a number of essential chemicals, which are normally produced on a very large scale. Apart from the lack of nearly all the essential equipment, no basic chemicals, such as sulphuric acid, caustic alkali, and hydrochloric acid, were locally available. Neither were chemicals for analytic work to be obtained. Despite all these serious handicaps, the production of a large number of substances could be undertaken in due course, among them various basic chemicals, which, it is believed, will prove to be of permanent value for Pales-



Pharmaceutical Research Institute, Rehovoth

*Photo* SCHWARZ



Laboratory (medical plants)

tine's chemical industry also in the post-war period.

Owing to the difficulties encountered in obtaining suitable processing equipment, many chemical processes put into operation in Palestine had to be adapted to local conditions. This required laborious research, in which the chemical departments of the Hebrew University and the Hebrew Technical Institute took a very active part. The manufacturing process for various substances, such as nitric acid, sulphuric acid for accumulators, acetic acid, furfural, methyl alcohol, ethylene are only a few of the many research projects successfully carried out and put to practical use. Many of these processes, in turn, initiated other industries. Thus, e.g. the local production of acetic acid made possible the manufacture of esters, such as ethyl acetate, butyl acetate, and amyl acetate which were required in the production of lacquers and varnishes. This industry has been of great importance during the war for the whole Middle

East since its products are being used for the protection, against climatic influences, of cars, planes, engines, etc. When ethylene, which was in the first instance being used for speeding up the ripening of bananas, became locally available, it stimulated the manufacture of ethylene chlorohydrine, which serves to reduce dormancy in seed potatoes, and of ethylene dibromide used as a grain fumigant and for other purposes. Methyl alcohol and hydrochloric acid were the starting materials for methyl chloride, the production of which helped to alleviate the shortage of refrigerants vitally important for the food industry.

Rubber shortage stimulated research into the reclaiming of rubber, and a new method worked out at the Daniel Sieff Institute was introduced into a local factory. Coal shortage speeded up the research on the hardening of cement carried out at the laboratories of the "Nesher" Portland Cement Factory and resulted in the introduction of a new type of cement which has

already been put into use in tens of thousands of tons. The development of this cement may be considered to be one of Palestine's important achievements in helping to save labour and fuel and increasing Palestine's cement production in the most critical days of the war.

#### Citrus Industry.

Citrus fruit was Palestine's main export product before the war, but wartime conditions and the drastic restrictions of shipping altered the situation radically and led to serious difficulties. An additional outlet for unexportable fruit had to be looked for, and fortunately the desperate situation of the country's citrus growers could to some extent be eased through the expansion of the citrus by-product industry. Remarkable progress was made in the manufacture of concentrates which are now being produced by a number of factories. Their owners have shown sound judgment and great understanding for the significance of scientific research by organizing co-operative research in this field, and while these lines are being written a Committee of Palestinian experts is studying in England and the United States the processing methods recently developed there. These developments will be to the benefit of the country also after the war, since even in peace time about 20 per cent. of the citrus production, although suitable for consumption on the spot, is unfit for export for some reason or other. On the whole, citrus research has not received the attention it deserves, in view of the predominant place of citrus fruits in this country's economy. Very little systematic research has as yet been done on the biological and chemical problems involved and science has contributed only a few achievements, e.g. a diphenyl-impregnated wrapper elaborated at the Hebrew University's Department of Physical Chemistry. By the use of this wrapper, wastage of citrus fruit through rotting during the shipment, is reduced by 85 per cent. This method was put into practice with full success in the first years of the war and now, when the shipping of fruit to the United Kingdom is being resumed, it serves again to reduce financial losses and to utilize valuable shipping space to the utmost extent.

The utilization of waste oranges was investi-

gated under a different aspect by the Daniel Sieff Research Institute by the adaptation to this raw material of Dr. Weizmann's process for the fermentative production of acetone and butyl alcohol. The outbreak of the war made it impossible to set up a properly equipped factory for the fermentation of oranges and orange peels, and for the time being the process was therefore introduced into two existing alcohol distilleries which could supply the Middle East market with acetone and butyl alcohol—two substances of vital importance for the war effort. The industry of citrus concentrates was also helped by the Sieff Institute through the development of acid-proof lining as a substitute for stainless steel unavailable during wartime.

#### Instrument Industry.

This industry was brought into being by the war. As in the United Kingdom and America, the Palestinian instrument market was before the war also dominated by German products, and immediately after the outbreak of the war the lack of supplies was badly felt. An important section of this industry is reviewed in another article in this book and therefore here only a few representative examples will be given.

At the Hebrew University's Department of Physics, the production of quartz oscillators—needed to stabilize the frequency of radio transmitters—supplied many tanks, airplanes and mobile radio stations in the Middle East with that vital part of their equipment. When the Middle East authorities turned to the Department of Physics in this matter, it was not only necessary to elaborate a production method, but also to construct all the tools. After many months of intensive research, at a specially equipped workshop of the Department, the very intricate manufacturing process was begun which leads to the production of plane-parallel plates ground to an accuracy better than 1, 20,000th inch. For this purpose the Department had to construct their own lathes, diamond cutting wheels, grinding tools, and an apparatus for measuring and adjusting the thickness of the plates. It is not possible as yet to reveal the number of quartz crystals supplied to military authorities, in particular to the Combined Signal



Corps of the M.E. during the last few years, but it is certain that this production was one of the University's important contributions to the war effort.

Another problem connected with Army and Navy requirements in the Middle East, the repair and reconditioning of transmitters and rectifiers, was tackled at the University's Department of Physical Chemistry together with the Department of Physics. This, again, helped to relieve a precarious situation when the shipping of valves from abroad was restricted.

Stimulated by war-time conditions, another important branch of the instrument industry, the making of glass apparatus for scientific, industrial and medical laboratories, was developed at the Department of Physical Chemistry and later turned over to an industrial enterprise which is now producing under the Department's guidance and supervision. Besides all sorts of lampblown instruments, also calibrated glassware, thermometers, hydrometers, mercury switches, various parts for high vacuum equipment, and ultraviolet burners are being produced or repaired. Many of these instruments are but small items in the great field of instrument making, but their availability under war-time conditions was of greatest help for the country's war industry, for many laboratories and for the Army. Since the cost of the raw material constitutes only a small percentage in the price of finished product, local glass instrument making has good post-war prospects. Fifteen young men are at present being trained in the art of glassblowing and calibration, and it is hoped that many more will follow.

The Electrical Laboratory and the Precision Measurement Laboratory of the Hebrew Technical Institute are engaged in the manufacture, repair and calibration of other types of instruments, such as water meters, flow meters, electrical measuring apparatus, photometers, X-ray apparatus, diathermy apparatus and cardiographs.

#### Pharmaceutical Industry.

The pharmaceutical industry, starting from modest beginnings several years before the war, developed in rapid strides during the war to an important section of the Jewish industry. It

could supply Palestine and the Middle East with a number of vitally important drugs and pharmaceuticals at a time when imports were restricted to a minimum and when not enough manpower was available in the U.K. and the U.S.A., to meet the demands in the Middle East. The combination of many factors made the growth of this industry possible. The enterprising spirit of the existing factories, the export knowledge and practical experience of their staff, and the fruitful co-operation with the scientific laboratories—all these together led to remarkable achievements.

While the pharmaceutical industry in Palestine in its early days, started with the simple reproduction of well-known standard preparations, it was soon able to extend its manufacturing processes to the synthesis of essential compounds. Although in most of these cases the manufacturing process is not an original one, the expert will understand what obstacles had to be surmounted, and what difficulties to be faced in a country which lacked both intermediate products and adequate processing facilities. In the development of a number of synthetic processes, the Sieff Institute played a leading role. Its scientific experience in similar fields made possible the establishment of a factory in which an anti-malarial compound, sulpha-drugs, analgatics, hypnotics, various anti-septica and other products are all being synthesized. Also other pharmaceutical factories made great progress in different fields. Testosterone, a cardiac glucoside and a highly active liver preparation are only a few examples of products successfully introduced into the medical practice. In the development of these products the Hebrew University's Department of Physiology, Bacteriology and Hygiene, its institute for Hormone Research, and its Pharmacological Section, took an active share. Various departments of the Hadassah-University Hospital and the Palestine Medical Association are engaged in standardization and quality tests; their scientific control guarantees the high standard of Palestman pharmaceutical preparations introduced into the Middle East market. The services in an allied field rendered by the Department of Bacteriology and Hygiene of the Hebrew University deserve mention. A shortage of typhus vaccines for the civil population was

felt during the war as the quantities supplied by the United States were restricted for military purposes. In 1942 vaccines were prepared by that Department for Polish troops and Polish refugees in Russia. Later the demands of other allied nations, in particular Russia, and of the

Jewish Communities in Yemen and Teheran, could be met. Under the same scheme dysentery toxoid (Shiga) and dysentery vaccine (Flexner group) were prepared.

Penicillin also, although as yet not of a high purity, is being produced in Palestine.



Hebrew University with old city in the background

The future destiny of Palestine's pharmaceutical industry depends upon several factors. Palestine will possibly be able to compete economically with speciality products, the price of which is not determined by the cost of the raw material but by that of skilled labour, and which are not

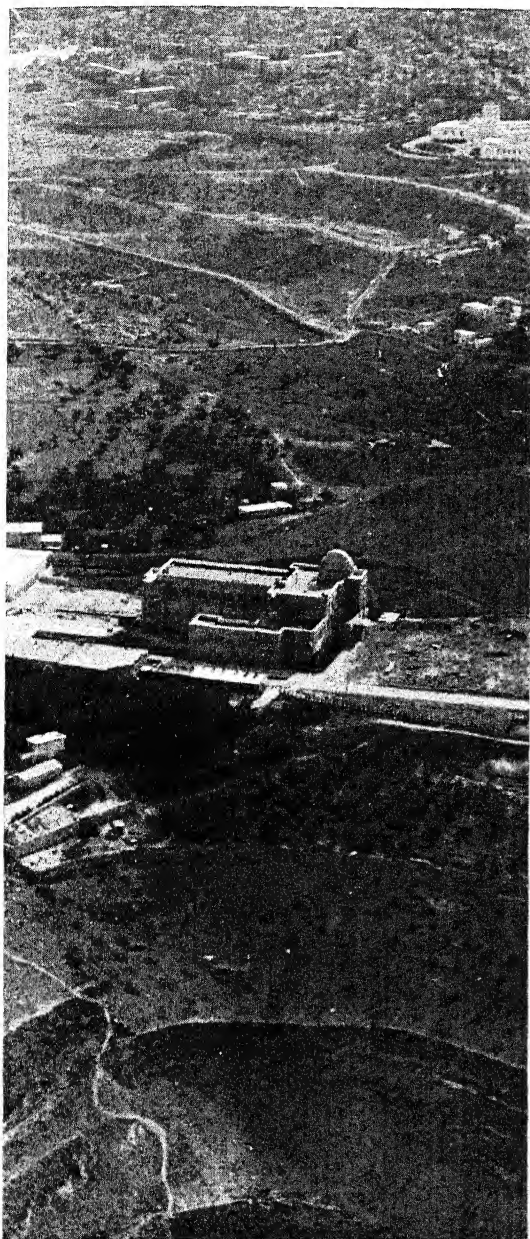


Photo PALESTINE HOUSE

suitable for mass production in great manufacturing units. If the cost of living in Palestine goes down to a normal level, conditions will be favourable for certain pharmaceutical products. The development of original pharmaceutical specialities would require the establishment of pharmacological and pharmaceutical institutes for which we have a nucleus in the Pharmacological Section of the University, and for which we also have the necessary scientific manpower, but not the funds. However, the elaboration and introduction of such original products requires long-term research with uncertain prospects, and it would seem reasonable for the young industry to concentrate, in any case, on the specific problems and demands of the Middle East which are likely to be less closely followed by enterprises in other countries with less limited means.

A new field for the pharmaceutical industries has been opened up by investigations of local medicinal plants. Research in this field is being carried on with promising results by the Jewish Agency's Industrial Research Institute, in collaboration with the Department of Botany of the Hebrew University.

#### Palestine's Example.

It can be said that in Palestine, science has given the answer to all those who doubted the practical feasibility of a Jewish National Home, who doubted that Palestine's soil can be made fertile again, who doubted that in a country devoid of so many "essential" natural resources, an industry could ever prosper. Within a comparatively short period, industry has become one of the most important factors of Palestine's economy. It is now giving more lucrative employment to thousands of Jews and Arabs and has multiplied the number of skilled workmen. It has absorbed new immigrants who could offer their expert knowledge and special experience thus opening up many fields as yet unexploited. Industry attracted brains and hands, men of science and men of enterprise, and capital, thus helping to increase the country's absorptive capacity. Industry and science joining forces together in planning and execution, have proved to be among the pillars of the Jewish National Home.

## War Industries of Palestine

Owing to its geographical situation and its general dependence upon imported foodstuffs and raw materials, Palestine was more immediately affected by the severance of the lines of communication through the Mediterranean on the entry of Italy into the war, than other countries of the Middle East. And when adjacent countries, upon whom it had formerly relied for a considerable portion of its food supply, showed a strong disinclination to permit the export of foodstuffs, its position became difficult indeed. Notwithstanding its perilous situation, however, it is an incontrovertible fact that there has at no time during the war been a scarcity of food or other necessity of life which has amounted to more than serious inconvenience. The fact that Palestine has been protected from the direct impact of war and that its population has been provided with a food supply on a scale undreamed of in the occupied regions of Europe has not always been appreciated or, if appreciated, has been too readily forgotten.

On the outbreak of war immediate steps were taken by Government to obtain control over all stocks of engineering and building materials under the powers contained in the Defence Regulations, so that they might be made available for works of defence and security. In many respects these stocks were considerable in relation to the country's normal rate of consumption and in the case of steel water tubes and pipes proved to be of the highest military importance in the defence of the Eastern Mediterranean and North Africa. At the time of Italy's declaration of war the stocks of pipes available in Palestine amounted to over 7,300 tons, or about 480 miles, the great majority of which were requisitioned for provision of water supply systems for troops operating on the Libyan frontier of Egypt. The majority of these pipes had been brought to Palestine through the *Haavara*\* organization as a means of withdrawing from Germany part of the funds belonging to Jewish victims of the Nazis. It is poetic justice that these pipes were ultimately

\* Hebrew for 'transfer.'

used to provide water for the Western Desert defences and assisted in the destruction of the German and Italian armies in North Africa.

The first reaction in Palestine to the war was a tendency to widespread unemployment, but, in the construction field at least, this was soon offset to some extent by Government and Army works for the improvement of the internal defences of the country.

In the spring of 1940, in order to release military formations from internal security duties, Government undertook the execution of a very large programme of construction of police-posts and stations throughout the country, from Metulla in the north to Gaza and Beersheba in the south, the cost of which amounted to about LP2,000,000. The magnitude of this scheme, which comprised the construction of fifty-seven buildings, many of which were major works in themselves, taxed the capacity of the construction industry of Palestine to its utmost. The quality of workmanship and materials was of a high order, control over the former being maintained through a carefully organized system of inspection and over the latter by a very complete utilization of the services of the Testing Laboratory of the Association of Engineers and Architects, which now forms an integral part of the recently formed Standards Institution of Palestine.

Notwithstanding the many difficulties arising from the closing of the Mediterranean route by Italian intervention in the war, the scheme was completed in its entirety within some weeks of the time allowed, without any sacrifice of quality or material increase in cost. Very large quantities of material had to be imported for the scheme but much material was available in the country from stocks which were 'frozen' on the outbreak of war and much assistance was received from the local metal and woodworking industries.

As a result of the difficulties and delays involved in importing supplies for the police buildings and other works, a considerable volume of work fell to local industries able to undertake the manufacture of building supplies of several

kinds. The whole of the furniture and wood-work, the steel door frames and many of the steel windows of the police buildings were manufactured locally, together with the steel grilles which protected all the ground floor windows. The steel doors for the armoured car entrances and for the main doors, together with special equipment of various kinds, were also produced in Palestine workshops. The engineering and metal industries, therefore, recovered from their first setback but towards the end of 1940 it became necessary, in order to prevent serious unemployment, to take all possible steps to utilize the potential manufacturing capacity of the country.

Although every effort was made to secure Army orders for Palestine industries, little practical result was obtained until after the formation of the War Supply Board on 25th February, 1941. During the first six months of the life of the Board orders were small and spasmodic owing to the lack of raw materials, but by the beginning of 1942 the benefits of the work of the Board became apparent and supplies of raw materials began to come forward. By May, 1943, the number of workers employed in the metal industry had increased by 63 per cent. over the corresponding figure for 1939, while the number of workers in the textile, clothing and leather industries showed almost as great an increase over the same period.

The orders executed under the control and supervision of the Directorate of War Production covered a wide variety of products, many of which had not previously been manufactured in Palestine. In the engineering field, these products ranged from ammeters and anti-tank mines to welding transformers and vices, while the products of the chemical industry varied from acetone to red dope for aeroplane fabric. One of the most important products, from an employment point of view, was the welded mild steel container, of which nearly eight million were manufactured and the production rate of which, at one time, attained a peak of 20,000 two-gallon containers and 8,000 four-gallon containers per twenty-four hours. Next in order of magnitude was the production of anti-tank mines, of which over three and-a-half millions were produced. In many cases, the machinery and plant required to execute the

orders had to be manufactured locally or improvised from machinery designed for other purposes. The presses for the manufacture of anti-tank mine components, for example, were improvised from machines intended for the manufacture of cement floor tiles. In numerous cases plant had to be devised for special purposes as, for example, the machine for the manufacture of cast iron shrapnel balls for anti-personnel bombs, of which about 500 tons were produced. Successful experiments were also carried out on the production of cast iron products by a centrifugal method of casting and the process has since been applied to the manufacture of cylinder liners and piston rings. The following is a list of the more important contracts executed on behalf of the Services and the Government of Palestine :—

Item	Quantity actually delivered up to 31 5 1945
Accumulators, electric, lead acid type .. .. .	25,738 Nos.
Acetone .. .. .	6.7 Tons
Assemblies, various .. .. .	2,168,664 Nos.
Batteries, dry .. .. .	1,896,220 Cells
Beds and Bedsteads, various .. .. .	41,286 Nos.
Blades, razor .. .. .	4,000,000 Nos.
Bodies, motor vehicle, various .. .. .	819 Nos.
Bollards, quay .. .. .	44 Nos.
Boot tips .. .. .	664,000 Pairs
Brushes .. .. .	56,284 Nos.
Cables, electric, various .. .. .	3,905,097 Yds.
Caps, containers, brass and mild steel .. .. .	8,260,000 Nos.
Chocks, R.A.F. .. .. .	24,865 Nos.
Cisterns, various .. .. .	640 Nos.
Containers, accumulator, plastic .. .. .	93,025 Nos.
Containers, M.S., 2 gallons .. .. .	6,121,000 Nos.
Containers, M.S., 4 gallons .. .. .	1,675,000 Nos.
Dies, sheet metal pressing .. .. .	30 Tons
Extinguishers, fire .. .. .	11,197 Nos.
Furniture, items, various .. .. .	80,293 Nos.
Glue, bone .. .. .	153 Tons
Guns, lubricating .. .. .	3,710 Nos.
Heaters, aircraft .. .. .	1,000 Nos.
Helices, screw pile, cast iron .. .. .	332 Nos.
Hooks, crane, cast-steel .. .. .	32 Nos.
Igniters, anti-tank mine .. .. .	2,201,790 Nos.
Insulators, cast basalt .. .. .	200,500 Nos.





Making ampullae

*Photo* BERNHEIM

Jacks, lifting, hydraulic ..	130 Nos.
„ „ mechanical ..	3,535 Nos.
Mess tins .. ..	396,000 Nos.
Mines, anti-tank .. ..	3,639,250 Nos.
Nails .. ..	1,215 Tons
Paint .. ..	3,364 Tons
Pistols, spraying .. ..	450 Nos.
Pumps, centrifugal, various ..	153 Nos.
„ semi-rotary, hand ..	2,450 Nos.
Separators, accumulators ..	4,479,948 Nos.
Shrapnel, anti-personnel bomb	500 Tons
Sprayers, insecticide .. ..	72,700 Nos.
Stoves, various .. ..	19,314 Nos.
Tanks, petrol, etc. .. ..	451 Nos.
Torches, oxy-acetylene weld-ing	480 Nos.
Transformers, electric, various	63 Nos.
Vices, engineer's, bench ..	4,300 Nos.
Washers, leather .. ..	5,150,000 Nos.
„ mild steel .. ..	10,585,000 Nos.
Wire gauze .. ..	6,000 Sq.ft.
Weights, metric .. ..	11,000 Sets
Water-cans, aircraft .. ..	65,677 Nos.

By the middle of 1943 the metal industry was working at full pressure, many workshops being on three shifts per 24 hours, and this continued until the end of the year. Early in 1944 there was a sharp reduction in the number of orders placed by the Army and by the end of the first quarter the production of mild steel containers, hitherto the most valuable single source of employment, had ceased. In order to meet, as far as possible, these changed conditions, the Director of War Production introduced a scheme for the manufacture of Consumer Goods, which met with a large measure of success. The objects of the scheme were as follows:

- I. To provide articles of good quality at reasonable prices;
- II. To provide employment for factories hitherto engaged upon Service orders;
- III. To facilitate a smooth transition from war work to civil production and to ensure conditions favourable to rationalization.

The criteria upon which the decision to manufacture any particular article was based, were:—

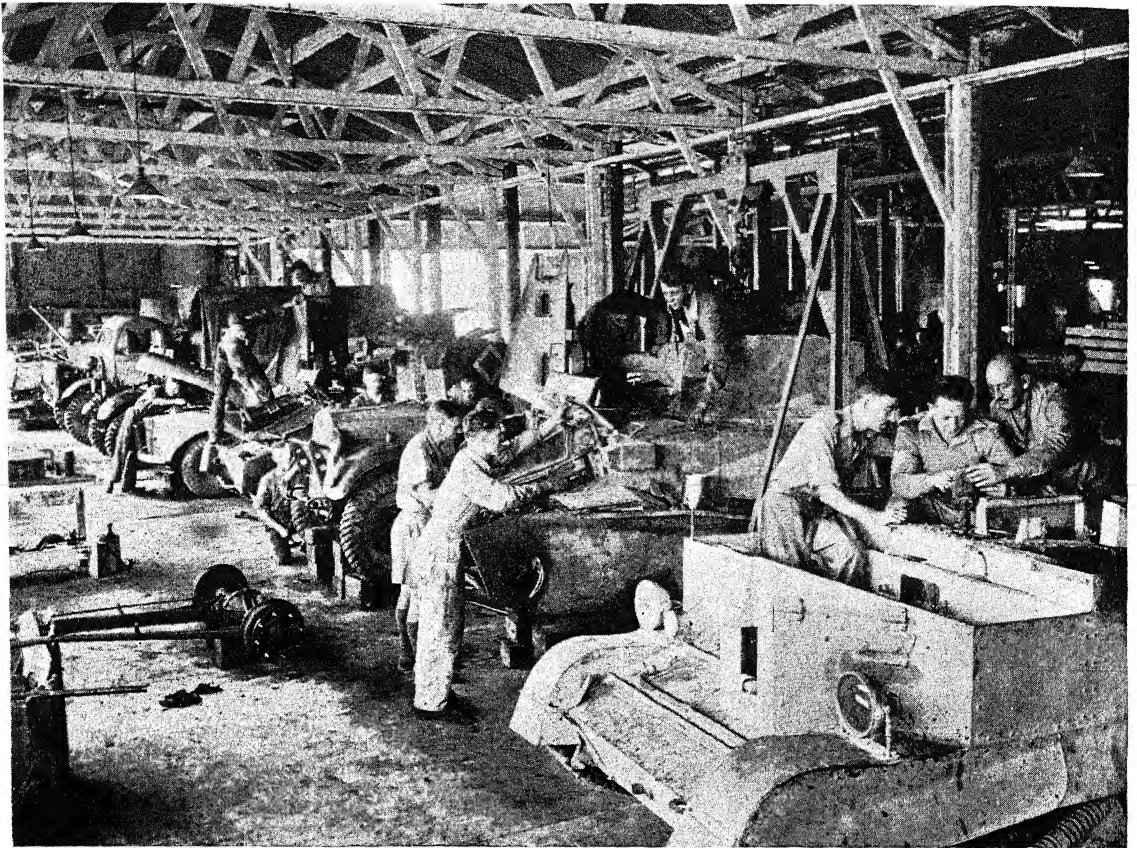
- a: The article is essential to a reasonable standard of comfort of a large section of the population;
- b: The article could be produced at a low price compared with the price prevailing in the market;

c: It could be manufactured with existing plant and without a large capital investment.

The following is a list of articles in production under the scheme in June, 1945:—

Ash trays.  
Balances, weighing, various.  
Bedsteads, various.  
Bread bins.  
Burners, fuel-oil, various.  
Cabin-hooks.  
Cigarette lighters.  
Coat-hangers.  
Cocks and valves, various.  
Cooking stoves, various.  
Cooking utensils, electric  
Cots, children's.  
Cutlery.  
Flat-irons, electric.  
Flat-irons, other.  
Flt-guns.  
Frying-pans, steel.  
Furniture, folding, steel  
Heating stoves, various.  
Hot-water bottles.  
Hurricane lamps.  
Ice-chests, two types.  
Kitchenware, aluminium.  
Kitchenware, enamelled.  
Lamp-burners, various.  
Lamps, kerosene, various.  
Lunch-boxes, steel.  
Mincing machines.  
Orange-squeezers.  
Padlocks, various  
Perambulators, two types.  
Potato peelers.  
Primus burners.  
Reading lamps, electric.  
Rubber products, various.  
Safety razors.  
Sieves, wire, kitchen.  
Spectacle-cases.  
Steel wool.  
Table lamps, electric.  
Toasters, electric and flame.  
Trays, steel.

That what has become known as the P.C.G. (Production of Consumers Goods) Scheme has been a success there can be no doubt. Not only has it succeeded in providing a considerable



A Jewish tank repair unit

Photo KEREN HAYESOD

range of domestic utensils and household requisites of good quality at prices much below those formerly ruling in the market, but it has given a great deal of employment in factories thrown out of work by the cessation of Army orders, while the psychological effects of the scheme have also been good in so far as they have provided the public with a new and more rational standard of values. Many commodities have been brought into production which could not have been manufactured without the assistance afforded by the scheme, while at the same time it has provided manufacturers with an opportunity of rationalizing their workshop organization and technique to an extent which should increase their ability to meet post-war competition.

It is not possible within the compass of the present article to review in detail the whole of

the industrial war effort of Palestine and it would be invidious to select any particular branch of industry for special treatment. It may, however, be useful to describe a little more fully a few of the activities which have a particular interest by reason of the importance of the product to the war effort or the possibility of the production having a post-war value.

#### Sheet Metal Working.

From the point of view of the importance of the product to the war effort, the sheet metal working industry probably takes first place. Owing to the difficulties of supplying the Army in North Africa by the Cape of Good Hope route, the ability of Palestine to supply nearly 3,640,000 anti-tank mines was of the greatest importance during the time of Rommel's

offensive drive into Egypt. The number of mines supplied by Palestine would provide a minefield of about three-and-a-half square kilometres in area, or a protective belt twenty metres deep over a length of about 170 kilometres. During the advance after El Alamein the supply of water and petrol provided a problem of the first magnitude and again Palestine's ability to supply nearly 7,800,000 mild steel welded containers, having a total capacity of nearly 19,000,000 gallons, was a most fortunate circumstance. Had the containers been imported from the United Kingdom or the United States the shipping space occupied would have been of the order of 75,000 tons. The majority of the work of stamping out the blanks for mines and containers from mild steel sheets and pressing the blanks into shape was carried out upon locally manufactured or locally improvised machinery, much of which was original in design. Large numbers of men and women without previous experience were trained in oxy-acetylene welding and at the peak of production the staff of welders amounted

to over fourteen hundred. The quality of the workmanship of women welders was, at least, as good as that of the men.

The workshops in which the manufacture of mines and containers was carried out had to be expanded rapidly to cope with the urgency of the demand and at a particularly vital moment the work was carried out continuously on three shifts a day seven days a week. One workshop, which formerly employed about twenty-five workers, at the peak of production output had a labour force of over nine hundred employees of both sexes.

Materials for the manufacture of the mines and containers was supplied by the War Department to an amount of over 34,500 tons and so great was the volume of the work that at one period the disposal of the scrap from the cutting and blanking operations became a source of serious embarrassment. This scrap material has since been utilized for the production of enormous quantities of useful products, from frying pans and ash-trays to boot tips and heels and mild steel washers.

The factories employed on the production of anti-tank mines and mild steel containers have now reverted to civil production and the experience gained in mass production methods is being turned to good account in the manufacture of hurricane lamps, cooking utensils, enamelware, aluminium kitchenware, safety razors and other consumer goods under the P.C.G. scheme.

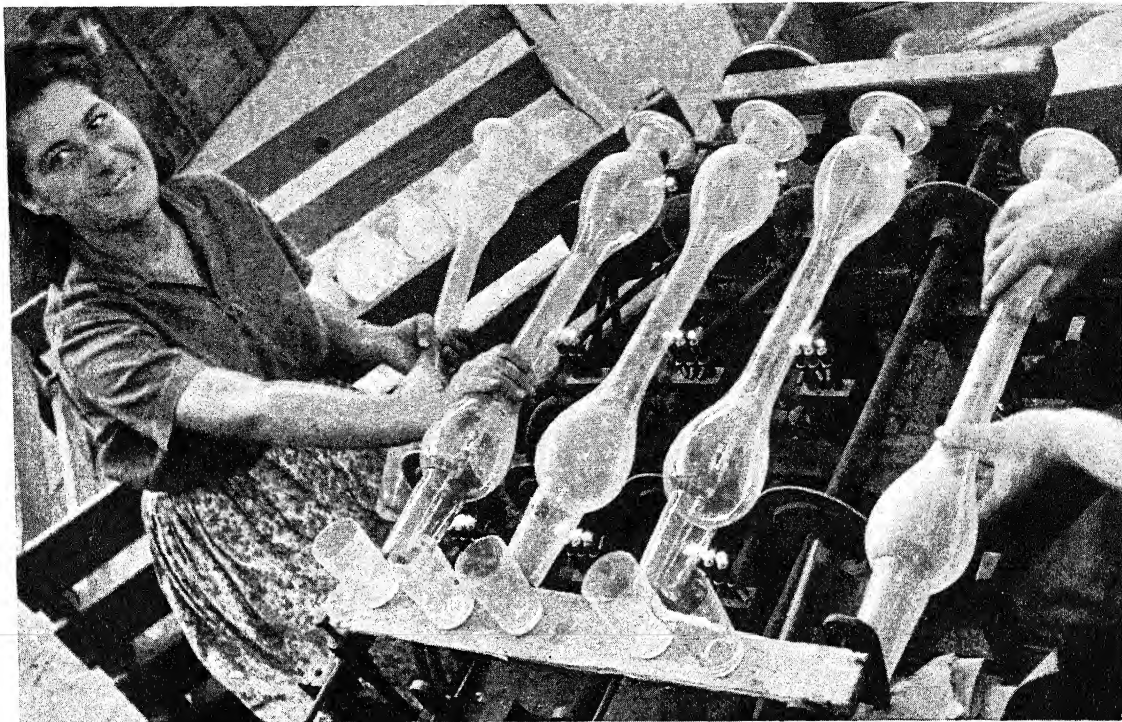
#### Manufacture of Calcium Carbide.

Soon after the entry of Italy into the war difficulties began to be experienced in obtaining supplies of calcium carbide required for sheet metal welding by the oxy-acetylene process and led to the establishment of a small factory at Ramat Gan early in 1941. The calcium carbide was manufactured in a specially constructed electric furnace which (with its transformer) was manufactured locally, by the action of an electric arc on a mixture of limestone and local charcoal. Many difficulties were encountered, particularly in the development and manufacture of suitable electrodes, but these were gradually overcome and the output of this factory played a very important part in the war



Photo KEREN HAYESOD Making handles for hoes and shovels





Manufacturing glassware

Photo BERNHEIM

effort, as without a plentiful supply of acetylene the manufacture of mild steel containers, the metal industry's most important contribution to the equipment of the Army in the Middle East, would not have been possible. The output of the carbide factory has also been largely used on ship repairs at Haifa and in the manufacture of consumer goods for a variety of civilian needs; considerable quantities were also supplied to Army workshops, to the Government of Pales-

tine and to workshops servicing the transport industry of the country, and last but not least, Palestine was able to assist adjacent territories by exports of carbide amounting to over 200 tons during the years 1942-44 inclusive. The present cost of production is very high and there appears to be no possibility of the undertaking being in a position to compete with the imported product in the future. The following table shows the general distribution of the output from 1941 to 1944:—

	Output Tons	Armed Forces Tons	Government and Public Services Tons	Transport Tons	Metal Industry Tons	Export Tons
*1941	103.5	—	Separate records not maintained.			—
1942	315	—	85	—	120	115
1943	328	25	35	30	196	42
1944	340	27	36	30	195	52

\* July-December inclusive.



## Production of Superphosphate Fertilizer.

Owing to the impossibility of obtaining supplies of superphosphate fertilizer from overseas for Middle East territories, Messrs. *Taasiyah Chemith*\* Ltd., with the co-operation of the United Kingdom Commercial Corporation, commenced the local manufacture of superphosphate in March, 1942. The raw materials first used were 'Acid Tar' from the Consolidated Refineries Ltd., and rock phosphate quarried from deposits in Trans-Jordan. Difficulties were experienced, however, in the practical use of the sulphuric acid recovered from the 'Acid Tar,' and in September, 1942, a mixture of equal proportions of 'Tar Acid' and pure sulphuric acid was adopted. Acknowledgement is due to Messrs. Consolidated Refineries for the considerable assistance afforded by them throughout the project, particularly in regard to the supply of sulphuric acid manufactured by them from sulphur imported for this purpose on Government account.

In order to ensure production under satisfactory conditions the Controller of Heavy Industries took over control in December, 1942, with a specially appointed Superphosphate Committee to advise him. The supply of raw materials gave considerable difficulty and the high cost of the crude rock phosphate and its transport from Trans-Jordan were a heavy burden on this war industry. The most serious difficulty, however, and one for which a complete solution has not yet been discovered, was the nuisance created by traces of Mercaptan in the exhaust gases from the plant. Many complaints were made and ultimately an action in the courts was brought with the object of obtaining an interdict. Every possible step was taken to abate the nuisance, but, as the production of crops in the Middle East was very largely dependent upon supplies of superphosphate, it finally became necessary to pass a Defence Regulation enabling production to continue notwithstanding that the nuisance had not been entirely abated. The total quantity of Superphosphate (containing 16 per cent. of water soluble  $P_2O_5$ ) manufactured up to the end of June, 1945, was over 28,500 tons, of which over 17,000 tons were exported to other Middle East territories.

\* Hebrew for 'Chemical Industry.'

The Taasiyah Chemith Company are now making arrangements for the continued manufacture of superphosphate under post-war conditions and have ordered a modern sulphuric acid plant and a complete superphosphate plant from the United Kingdom. This plant will be erected in the noxious trades zone of Haifa Bay, which should overcome future difficulties of production due to smell from traces of Mercaptan.

## Accumulator Manufacture.

One of the most ambitious contracts undertaken by Palestine during the war was the manufacture of a very large number of acid-lead electric accumulators for the Royal Air Force. When the contract was undertaken it was contemplated that raw materials would be provided by the Royal Air Force but owing to the scarcity of rubber a major difficulty was at once encountered in the manufacture of the hard rubber containers and separators. In the event, little plantation rubber was procurable and, although successful attempts were made to replace smoked sheet rubber by reclaimed rubber, the processing time became so protracted as to make the process much too expensive. After lengthy experiments, in which innumerable difficulties were overcome, an entirely satisfactory substitute for hard rubber was developed from a polymerized asphalt base, which successfully passed the very rigorous tests demanded by the Inspection Service of the Royal Air Force in the case of new or substitute materials. The difficulty of separators was overcome by the local manufacture of wooden separators by means of an ingenious adaptation of existing wood-working machinery. Another interesting development feature of this contract was the successful experimental work carried out with the object of:—

- a. Reducing the time required for the electro-chemical process of 'Forming' the plates from 80 hours to 18 hours. The average time required in well known factories abroad before the war was 40 hours.
- b. The development of a chemical process for treating Middle East timber as a substitute for high grade cedar for the manufacture of separators.

There is every possibility that, when the present

high cost of wages and, in consequence, the high cost of production in Palestine becomes reduced to more normal proportions, the experience which has been gained will enable the establishment of a local accumulator manufacturing industry capable of holding its own in quality and price with the imported article. The ability to produce quality has already been demonstrated to the satisfaction of the most rigorous and critical of Inspection Departments; the ability to compete in price will depend upon a more satisfactory relationship between wages and production.

#### Rubber and Reclaimed Rubber.

Since 1941 purchasers of motor vehicle tyres have been required to surrender old tyres and tubes at the time of purchase of replacements and these have been used to supplement the restricted supplies of new tyres by re-treading or, where the old tyres were unfit for re-treading, for conversion into reclaimed rubber. Two factories have been established for the reclamation of rubber, in the first of which the alkali-thermal process was used, but at a later stage a more convenient chemico-thermal process was developed. The second factory used a thermal-mechanical process, the product of which, however, has a less extended range of usefulness.

Rubber reclaimed by these factories has played a very important part in the war effort by providing a substitute for plantation smoked sheet rubber which was, and still remains, one of the scarcest, as well as one of the most important, raw materials for war purposes. In addition to a wide range of goods manufactured from reclaimed rubber, successful experiments have been made in tyre re-treading, in which the majority of the rubber content is reclaimed rubber. One company is at present engaged in the manufacture of electric cables, the whole of the rubber insulation of which is being produced from locally manufactured 'Reclaim.' These cables have been tested by the Laboratory of the Standards Institution of Palestine and certified as complying with the British Standard Specification No. B.S.S. 7 War Emergency PD 118, Amendment No. 3, 1943.

The following are among the more important

of the products which have been produced in Palestine from reclaimed rubber:—

- Rubber knee-boots.
- Rubber-soled shoes.
- Garden hose.
- Electric cable insulation.
- Electric wiring conduit.
- Rubber soles and heels.
- Rubber mats.
- Hot water bottles.
- Rubber erasers.
- Rubber stamps.
- Rubber brake linings, etc.
- Motor tyre retreading materials.
- Rubber tyres for perambulators, etc.
- Rubber tubing.
- Bathing shoes and sandals.
- Drain stoppage plungers.
- Door stops.
- Hard rubber for fountain pens.
- Hard rubber for insulation purposes.
- Waterproof fabric.

#### Cement in the War Effort.

The *Nesher*\* cement manufacturing plant, which has played a most important part in the war effort by the supply of very large quantities of cement to the Armed Forces for defence works and other purposes, had a pre-war capacity of about 240,000 tons per annum, of which 55 per cent. was produced by the dry process and the remainder by the wet process. In the dry process the raw materials pressed in the form of small briquettes, were calcined in a battery of six vertical anthracite coal-fired kilns, which were entirely dependent upon regular supplies of anthracite from the United Kingdom. In the wet process the raw materials were prepared in the form of a slurry and fed into a horizontal oil-fired rotary kiln. Both plants, in addition to fuel, required for efficient operation a regular supply of spare parts for machinery and grinding elements for the ball mills. The transportation of coal and spare parts became more and more difficult, particularly after the closing of the Mediterranean route, until a point was reached when the supply of anthracite coal ceased and the output of the factory was reduced

\* Hebrew for 'Eagle.'

to the capacity of the oil-fired rotary kiln, viz. 108,000 tons per annum.

It was at this point that the *Nesher* Company made an outstanding contribution to the cement supply problem by the development of a new type of 'Blended' cement, or what is believed to be an entirely original process.

The principle underlying the production of the new type of cement was the replacement of the coarser grains of ground cement clinker (over 40 microns diameter) by a suitably graded moist material, on the theory that the core of the coarse cement particles played no useful part in the hydration process. This replacement resulted in a better dispersion of the material capable of complete hydration and gave a corresponding increase in the 'Active surface.' Production was increased by between 30—40 per cent. at considerably reduced cost and after two years of satisfactory experience of the product it is unlikely that it will ever be necessary to revert to the former production of normal Portland cement.

The new cement, to which the name 'Portland Cement S' (selectively ground) has been given, possesses properties which are in a number of respects superior to those of normal Portland cement. The strength of "Portland Cement S," particularly the early strength, is higher, enabling economy on concreting work owing to the higher rate of utilization of the hardening energy in the ground clinker particles.

Following upon the development and production of the new type of cement another important innovation by the *Nesher* Company was the conversion of one of the vertical coal-fired kilns to oil firing. During the past fifteen years many attempts have been made all over the world to develop the production of cement clinker in vertical oil-fired kilns, but complete success had not been achieved at the time the *Nesher* experiments were started on a commercial scale in August, 1943.

The difficulty in all previous attempts has been the complete and economical utilization of the oil fuel and it would appear that this difficulty has been overcome in the *Nesher* experiments, by introducing a suitable mixture of primary air and flue gases at the top of the kiln, together with atomised fuel oil, and directing the mixture downwards towards the centre of the kiln into

the mass of raw material briquettes. Secondary air is blown in from the bottom of the kiln and the two streams moving in opposite directions are thoroughly blended, resulting in complete utilization of the fuel. After many practical operational difficulties had been overcome the first kiln completed its first continuous run of 24 hours in May, 1944, and since then has operated continuously for periods of up to eight weeks at a daily production rate of 75 tons. The conversion of a second kiln is approaching completion.

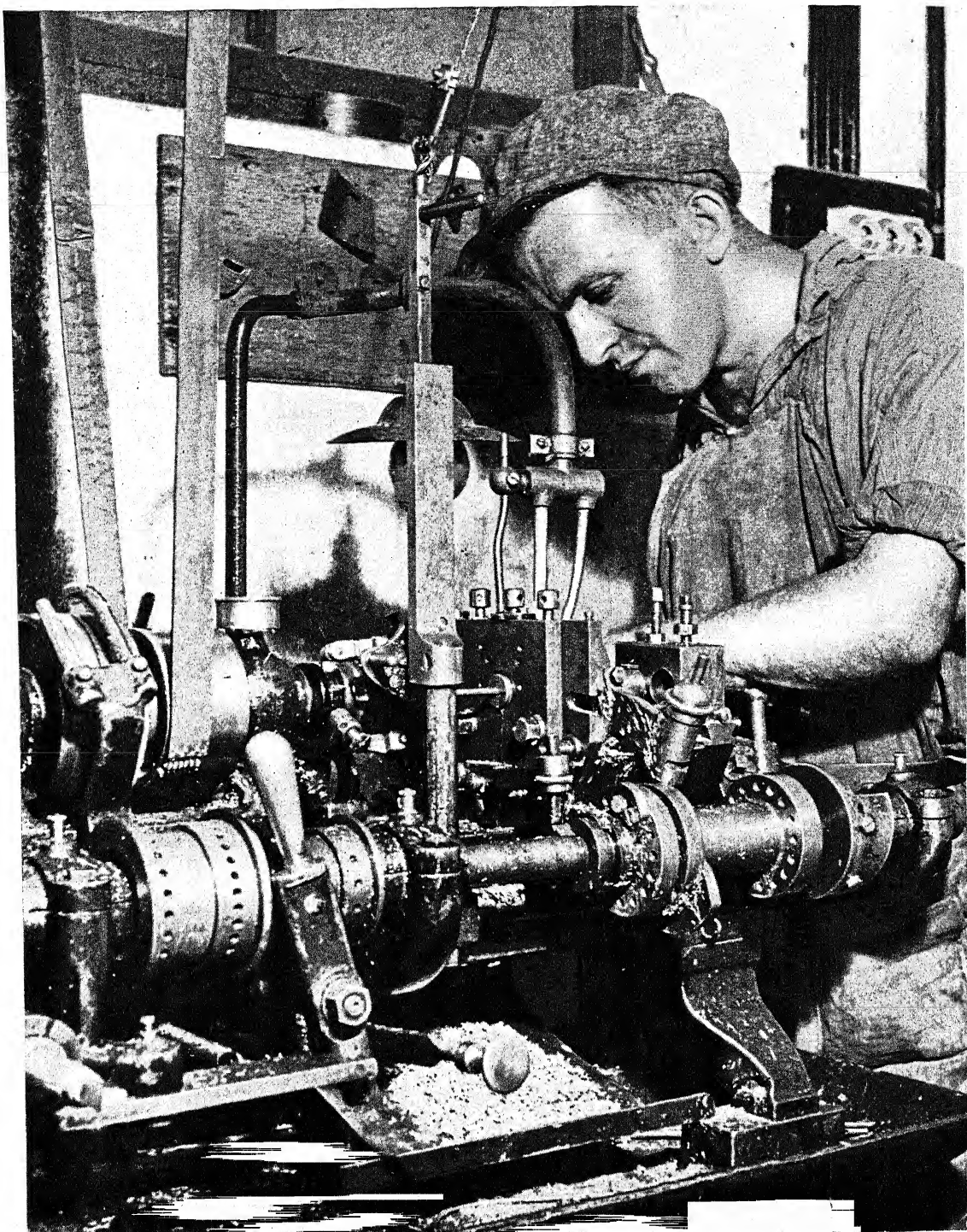
This development, originally planned as a war-time emergency measure for replacing coal by the more readily obtainable oil fuel, though still in the experimental stage, may prove to have many advantages over the coal fired process.

#### Motor Vehicle Spare Parts.

Owing to the diversion of the motor vehicle industry in Great Britain and the United States to war production it became necessary for these countries to ration the supply of spare parts on a value basis, the amount of which, due to the worn condition of the majority of Palestine's vehicles, was totally inadequate to maintain the essential transport in operation. In order to enable the recovery and reconditioning of automobile spare parts, legislation was provided to require the purchaser of a spare part to surrender the worn or broken part, which the purchase was intended to replace, to the dealer at the time of sale.

Early in 1943, with the co-operation of the principal spare parts dealers in Palestine, a private company was formed under the control of the Department of the Controller of Heavy Industries, for the purpose of organizing the recovery and reconditioning, as well as the production, of motor vehicle spare parts.

The Company was granted the right of collecting free of charge, worn and broken spare parts surrendered to dealers by purchasers and such parts as were fit for reconditioning or which could otherwise be made suitable for further service by repair or modification were handed over to selected workshops for treatment. Unusable parts were sold as 'scrap metal' through the Controller of Salvage, the proceeds being devoted to reducing the price of manu-



Producing parts for electric installations (1943)

*Photo KEREN HAYESOD*

factured spare parts to the consumer. Over twenty workshops were engaged in the reconditioning or production of spare parts, orders being placed by the Company under the supervision of the Controller of Heavy Industries. Selling prices for manufactured and reconditioned parts were fixed by the Controller of Heavy Industries, sales being effected by the Company through licensed dealers only, who were allowed discounts on a sliding scale in proportion to the amounts of their purchases. During a period of 24 months since the Company was formed, over LP100,000 of spare parts have been manufactured or reconditioned and sold.

#### Glass Industry.

Although glass making in Palestine has been carried on in an elementary way and in primitive directions for some time, the first attempt to produce glass, and, in particular, window glass, on a commercial scale was made in 1936 but, for a number of reasons, the venture was a failure and did not reach a satisfactory production stage. The plant and equipment lay idle until 1941, when it was taken over by *Solel Boneh Ltd.*, the contracting undertaking established by the General Federation of Jewish Labour (*Histadruth*), which provided a considerable amount of new equipment and, what was probably even more important, competent technical supervision and management. From the first the revived venture of Phœnicia Glass Works Ltd. was a success and, although it has been fortunate in being able to operate in a completely sheltered market, which will not be available under post-war conditions, the management and workers have gained valuable experience as well as making a most useful contribution to the war effort by the provision of a material not easily obtainable from any overseas source. The range of production has been gradually increased from the original product of window glass in a considerable range of thicknesses to glass tubing for a variety of purposes and as a raw material for the production of ampoules and laboratory glassware. The latest development of the undertaking has been the establishment of a factory in Jerusalem for the production of laboratory glassware under the supervision

and guidance of the Physical Department of the Hebrew University.

#### The Diamond Industry.

One of the most spectacular of the new industries of Palestine and one which has played a most useful part in the war effort by its earnings of U.S. dollars, is the diamond industry. Although there had been several attempts to establish a diamond polishing industry in the years immediately preceding the war, little real progress had been made. In 1939 a small factory was established at Nathaniya, which was quickly followed by others, and by 1945 over thirty workshops were in operation, giving employment to about 3,500 workers, which represents a considerable percentage of world employment in this industry.

The following table shows the rapid growth and importance of the industry to the economy of Palestine.—

	Imports (Rough Diamonds) LP.	Exports (Polished Diamonds) LP.
1941	150,000	200,000
1942	380,000	950,000
1943	1,140,000	2,600,000
1944	1,600,000	3,300,000
Totals	3,270,000	7,050,000

The majority of the diamonds which have been cut and polished in Palestine have been exported to the United States of America, where they have had a very favourable reception; markets are also being found in the Middle East and in India. The future of the industry in Palestine will depend upon a great many factors but there are grounds for believing that it has good prospects of survival. Recent negotiations with the London Syndicate and other European interests would appear to have assured Palestine of reasonable supplies of rough diamonds, including a proportion of larger stones, and future indications of demand are regarded as being favourable. World stocks of polished diamonds are low and the market for small stones, particularly in America, is likely to increase considerably, but the ability of Palestine to compete success-





Fixing reconditioned motor tyres

*Photo KEREN HAYESOD*

fully will depend very largely upon the ability of the local industry to settle its internal affairs more readily than it has up to the present. Of

a total of 106 industrial disputes in 1944, 21 were in the diamond industry and accounted for over 67 per cent. of the working days lost.

Before the war Palestine imported 85 per cent. of her textile requirements. These imports were reduced drastically after the outbreak of war until, in 1943, they amounted to only 30 per cent. of the pre-war figure. Local factories were, therefore, encouraged to increase their output to meet both the normal internal demand of the country and the needs of the Services stationed in Palestine and adjacent territories. As a result, the local output in 1944, amounted to four times its pre-war production figure. After meeting the demands of the Services, however, the total supplies available for civil consumption were still only 60 per cent. of pre-war requirements.

Local production has been handicapped throughout by the lack of textile machinery and by inadequate supplies of yarn. As equipment for the extension of existing factories could not be obtained from abroad, the industry resorted to local manufacture of textile machinery with some success. Various types of machinery, chiefly looms, were constructed locally and are operating satisfactorily.

The following table shows the production and employment development figures of the Ata Textile Co. Ltd., which is the largest textile factory in the country, carrying on spinning, weaving, finishing, as well as the manufacture of ready-made clothing. These figures may be taken as indicative of the development of the country's textile industry as a whole:—

Year	Spinning Tons	Weaving Metres	Ready-made clothing Value in LP	Workers employed
1939	430	1,114,000	—	—
1940	544	1,293,000	13,000	—
1941	680	1,500,000	88,800	456
1942	700	1,750,000	174,900	476
1943	800	2,150,000	276,000	628

#### Leather and Footwear Industry.

Before the war Palestine manufactured about 600,000 pairs of footwear of all types, out of a total consumption of approximately 1,300,000

pairs, the balance being imported mainly from Syria and Czechoslovakia.

These sources of outside supply ceased at a time when local demand was greatly augmented by the needs of Service personnel and of large numbers of immigrants; control of production and distribution was, therefore, instituted by the Department of the Controller of Light Industries. Up to the end of 1943, supplies of suitable raw hides were obtained from South and East Africa and from India; thereafter, procurement was restricted to Ethiopia and the Sudan and in consequence there was a considerable reduction in the quality of the hides supplied.

The importation of raw hides was vested in an Association, formed from previous dealers in the trade, and controlled by the Department of Light Industries. Collection of local hides was also centralized, in order that raw materials might be released to local tanners at the lowest possible prices and the price of production was controlled throughout to the final sale price. From 300 tons in 1939, the production of sole leather rose to 2,000 tons per annum in 1942 and 1943. Production of upper leather during 1942-1944 was in the region of 1,400,000 sq. ft. per annum, consisting approximately of 65 per cent. chrome-tanned boxsides and 35 per cent. vegetable-tanned sides.

In December 1941 a Utility Footwear Scheme was introduced by the Department of Controller of Light Industries, and proved highly successful. It now accounts for 25-30 per cent. of the total yearly output, which has reached 1,900,000

pairs, supplemented by about 60,000 pairs of canvas shoes soled with locally reclaimed rubber and about 150,000 pairs of Arab type shoes made from rubber and canvas stripped from old tyres.



Boots for the Palestine Police

*Photo BERNHEIM*

Considerable progress has also been made in the preparation of local leather (sheep, lamb and goat) for use in the fancy leatherware trade, but sales outside Palestine have not been appreciable.

It has been demonstrated during the war that Palestine is not only capable of meeting internal demands for footwear, but also of producing a surplus for export. Exports to Iraq and Iran during 1943 and 1944 were in the neighbourhood of 500 tons of sole leather and 100,000 pairs of footwear. Whether Palestine will be able to compete in open post-war markets will depend largely, however, upon two factors: the ability to obtain supplies of good quality raw hides, and facilities for improving mechanical equipment and methods of production.

#### Agriculture.

No account of the war industry of Palestine would be complete without reference to agriculture which, while not strictly speaking a war industry, has nevertheless contributed considerably to the solution of Palestine's war problems.

In 1942, prices of local agricultural produce began to rise, due to a growing shortage of food caused by shipping difficulties and the influx of troops and refugees. A Department of Controller of Agricultural Production was, therefore, set up in July 1942, complementary to the Department of Agriculture and Fisheries. This Department immediately concentrated upon assisting agricultural production by the procure-

ment to the fullest possible extent of all requisite materials and equipment, and by encouraging farmers to more intensive cultivation of the land. During the years 1939-1944 approximately LP800,000 were issued as loans to farmers for a variety of purposes designed to increase food production, while approximately LP3,750,000 were advanced as loans to citrus growers from 1940-1945. Substantial numbers of tractors, ploughs, combines and other equipment were procured under Lease-Lend arrangements and many other items, such as baling and poultry wire, milk cans, hose pipes, hand tools, etc., were manufactured locally from imported raw materials and scrap under a special scheme set up by the Directorate of War Production.

Some fifty Cold Storage Plants, of an average capacity of 50 tons each, were built in agricultural settlements under a scheme prepared by the Controller of Heavy Industries and financed by means of Government agricultural loans.

Adequate supplies of seed potatoes were obtained in 1943 and 1944 from the United Kingdom and distributed by the Department. This resulted

in a record crop of potatoes in 1944. Vegetable seeds and seedlings were cultivated at the Government Farm at Acre and sold or distributed free, with a favourable effect on local prices. Several million day-old chicks were distributed from Government hatcheries to assist in increasing poultry and egg production.

Adequate supplies of imported nitrogenous fertilizers were obtained and distributed, together with quantities of locally manufactured superphosphate and muriate of potash. The most important requirements of insecticides and fungicides were also provided for.

The Department received the full support and assistance of the Middle East Supply Centre, the Controller of Heavy Industries and Director of War Production and other Departments of Government in implementing its policy, with the result that local demands for fresh vegetables and fruit, potatoes, milk and dairy products, poultry and eggs, and other indigenous produce have been substantially met throughout the war, while a very considerable area of land has been permanently converted from dry farming to intensive production under irrigation.

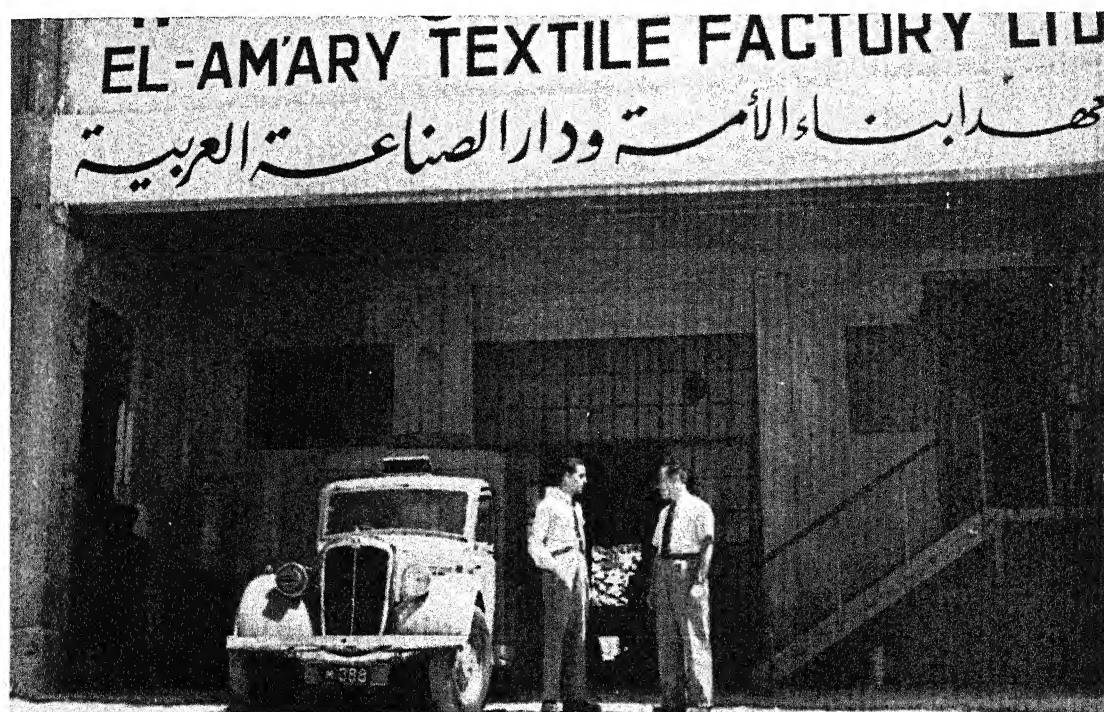


Photo SCHWARZ

Arab textile factory in Ramallah near Jerusalem

## The Building Industry.

Since the beginning of increased immigration, the building industry has been playing a very important part in the economy of Palestine. In the period between the two world wars it was the largest item in the national budget excluding agriculture; and significantly enough, it clearly reflected the ups-and-downs of the country's development.

The following table, computed from the Statistical Abstracts of the Palestine Government gives the volume of building and corresponding expenditure approximately for a 10 year period. It includes the four largest towns and 22 municipalities in respect of both private and municipal building activities:

Year	Floor space in sq. metres	Approx. value in LP.
1932	397,600	3,054,907
1933	845,930	5,702,305
1934	1,242,600	7,306,550
1935	1,407,260	8,702,830
1936	842,900	5,923,064
1937	677,660	4,377,215
1938	437,380	2,142,375
1939	301,340	1,683,065
1940	243,460	1,355,598
1941	166,900	934,973

The figures are definitely correlated to the economic and political events which took place during this period, such as the large immigration (1933-35), the Arab disturbances (1936-38), and finally the war period.

Turning to the future, but remembering the experience of the past, what is the expected volume of post-war building? As in other countries affected by the war, many competent bodies in Palestine too, have been dealing with this question from many angles. Factors such as prevailing congestion, expected immigration, financial considerations, employment of ex-servicemen and many other aspects have formed the basis for the various estimates.

There may be a sound, or at any rate cautious, approach to the problem in the findings of the *Research Committee for Economy in Building*,

appointed by the Association of Engineers and Architects in Palestine, from whose unpublished report many instances are cited in this article. The Committee has been dealing with the numerous problems of post-war economy in building along the lines adopted by the various Committees appointed by the Ministry of Works in the United Kingdom.

The question of the static demand for additional housing accommodation was considered by this Committee, which used as reference the official statistics already mentioned: The total floor space in an eight year cycle (1932-1939) was 6,152,670 sq. metres. Assuming that in each of the years 1942-1944 no more building had taken place than in 1941 (which is very nearly accurate), the deficiency as compared to the eight years pre-war cycle will be 5,241,610 sq. metres.

The deficiency is expected to be remedied in the next four years, of which the present year (1945) is to provide about one-half of the quotas intended for the three subsequent years. This will leave a normal requirement of approximately 1,500,000 sq. metres of floor space for the following years, the deficiency having been made good by the end of 1948.

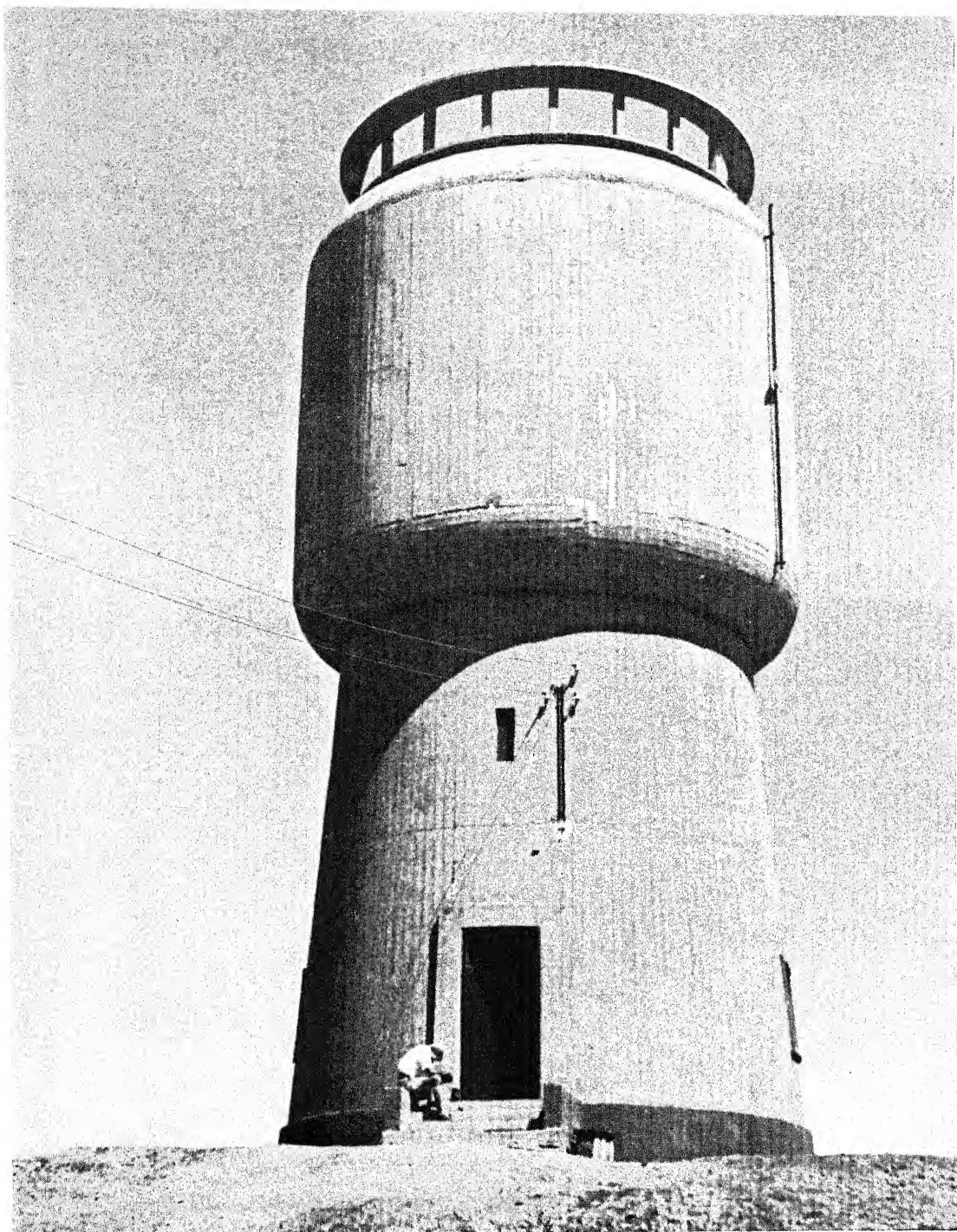
### Residential Development.

In normal times the proportion between purely residential and non-residential buildings was in the order of three to two. It is expected, however, that in the first few years of the post-war period the proportion will be somewhat more favourable to residential accommodation. It is also expected that for reasons of economy the two-and-three-room apartment will supersede the larger flat favoured in the earlier period.

The Research Committee visualizes the 1½ million sq. metres as providing 18,000 dwelling premises of two and three rooms each in equal proportions, leaving approximately ¼ million sq. metres for schools, hospitals, commercial, industrial and other necessary buildings required for residential development.

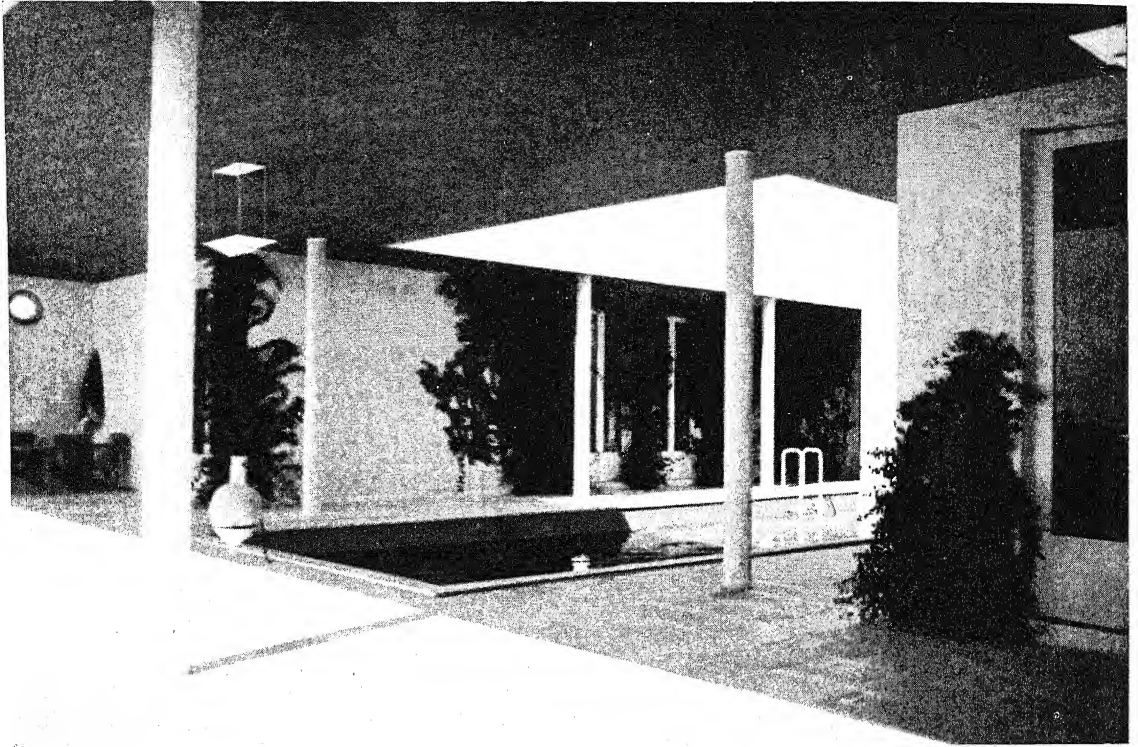
In urban districts the usual type of building





*Photo GIDAL*

Smallholders' water tower



Modern residence (Weizmann House)

*Photo LANDAUER*

erected would be a two-storey house (plus ground floor) comprising four flats of two to three rooms, kitchen, bath, W.C., entrance hall and two verandas on each floor. As regards suburban housing, the importance of which has considerably increased with industrial development, the foremost types are detached or semi-detached houses comprising two to three rooms, kitchen, bathroom, entrance hall and veranda. In suburban districts appreciable numbers of terrace houses containing six two-room flats could also be built. How is Palestine industry to supply the demand for the materials required for such a volume of building? Before a true answer to this question can be found, the present state of the building industry must be reviewed.

Prior to the first world war, the method of building was on the whole very primitive. Houses in villages were built chiefly from mud-bricks, and in towns stone from nearby quarries

was used for residential houses which never exceeded ground floor plus a first floor. A notable exception were the numerous religious and other public buildings which were also built of stone, the supply of which is both varied and plentiful in Palestine. With the exception of stone, and primitively burnt lime and sand, every other material and fixture had to be imported from abroad.

The last 25 years have witnessed a radical change in this picture. With the increased immigration immediately following the last war, the demand for modern dwellings, and rapid and cheaper construction, was felt in a steadily increasing manner. As a consequence, stone masonry had to give way to bricks or other artificial fabric. There are now in the country three factories manufacturing sand-lime bricks, one large works producing burnt clay bricks, and numerous plants making cement bricks and other walling units.

At present the use of stone is confined chiefly to Jerusalem, where stone-faced walls are prescribed by the building authorities for the inner city in order to preserve its character, and a few Arab cities like Nazareth and Acre. This limitation is to be deplored since an æsthetic effect in the harmony of stone with the surrounding landscape is desirable. It is to be hoped that methods will be found in the future to make stone masonry less expensive. The mechanization of stone quarrying and its working, as well as the devising of new methods of design, may be some of the means by which there may be a greater use of what is one of the most appropriate building materials in Palestine.

The substitution of stone, however, is by no means the only change which has occurred in the last twenty-five years. A more far-reaching influence was the introduction of reinforced concrete. The old construction was based on only timber and steel beams, but construction to-day makes most extensive and varied use of modern reinforced concrete. The establishment of cement works in Haifa, marketing a high grade product, provided a new and important impetus in this direction; and another cement works to meet the expected increased demand is being contemplated.

A list of locally manufactured building products would indeed be large. Of the 130 ingredients essential for building enumerated by the Research Committee, more than half are covered by local production, most of them in sufficient quantities to meet the  $1\frac{1}{2}$  million sq. metres requirement. Among the more advanced local factories are a modern up-to-date plate glass window works established only a few years ago: numerous kilns which produce lime, were as a result of the present shortage of coal and wood, adapted for the use of crude oil supplied by the Haifa Refineries; gypsum manufactured from locally available material—though its application for building (plaster of Paris) has not yet been sufficiently developed. Electric wires and cables, Bergman conduits and junction boxes, household appliances and other fixtures and accessories of electrical installations are also manufactured locally, some of them only after the outbreak of the war, when their import was

stopped. Several plants are manufacturing a great variety of paints and allied products. A young ceramic industry, manufacturing refractory bricks and now experimenting in the production of sanitary ware, must also be mentioned.

The requirements of the plumber, sanitary and heating engineer, such as bath tubs (enamelled cast iron), geysers, boilers, cast-iron pipes, flushing tanks and other appliances, will be well in hand provided sufficient raw materials are imported for their manufacture.

A marked progress can be recorded in respect of the manufacture of insulating boards to prevent the discomfort of excessive heat in summer as well as to promote the building of cold storage room. Citrus peels, reeds from Hule and other vegetables as well as many types of light-weight concrete have been used with a fair amount of success. To complete the list within the scope of this general survey, there are hundreds of workshops scattered all over the country supplying various needs of the carpenter and ironmonger.

#### Imports Required.

Difficulties arise out of the fact that a number of essential materials for building must be imported. The chief of these are mild steel bars for concrete reinforcement, rolled steel joists, timber for shuttering, scaffolding and roofing, zinc and galvanized iron sheets, galvanized iron pipes, fly screens, steel conduit pipes, sanitary ware, electric bulbs, radiators, etc. In addition, varied quantities of raw materials must be imported for the local manufacture of a great many commodities, e.g., steel sections for ironmongery, timber for joinery, scrap and pig iron for cast iron products, copper and other metals, rubber, asbestos, etc. It is obvious then, that no large-scale building is possible without solving first the problem of imports.

Then the  $1\frac{1}{2}$  million sq. metres development building scheme does not take into consideration the large immigration desired; neither does it provide for the large public works which all hoped to see started upon the termination of hostilities. There is also one adverse factor which should be faced—that is the economic

outlook. Wages in Palestine underwent a steep rise during the war, and as a consequence the cost of building is now almost 3-4 times higher than it used to be. It is not just a question of whether the capital required for the prospective housing area can be provided. Much more important is whether the rent based on these high building costs will not be exorbitant. The answer is in the affirmative, the monthly rent in the towns being calculated by some experts as not less than LP5 per room. The consequences of such high rents for our cost of living and the cost of production in general, are obvious.

#### Standardization.

To discuss the remedy would not be within the scope of this article. There are, however, a few instances in which engineers may be able to contribute to the solution of this problem. One is the standardization of building elements, which will enable mass production and consequently lower costs; another is mechanization on the building site, which, wherever building of great volume is involved, means cheaper construction. Yet another is economy in design, a question which is now receiving a great deal of attention from several authoritative bodies in the country; and last, but by no means least—austerity! It is to be hoped that the experience gained in war-time will not be in vain. The standard of our pre-war building was not always justified by the financial possibilities of the owner. This was particularly true in respect of agricultural settlers; here very often the costs of the house proved to be so heavy a burden that the farm was unable to prosper.

The building industry in Palestine is facing a chance it never had before. After the stagnation of the war years, a great deficiency in housing accommodation will have to be made good. Still more houses will have to be erected for the remnants of European Jewry coming to Palestine to establish a new home. Large projects which the future may prove to have in store for this country will tax the building industry to the utmost.

The greatest effort will be required from industry, the authorities, engineers, trade

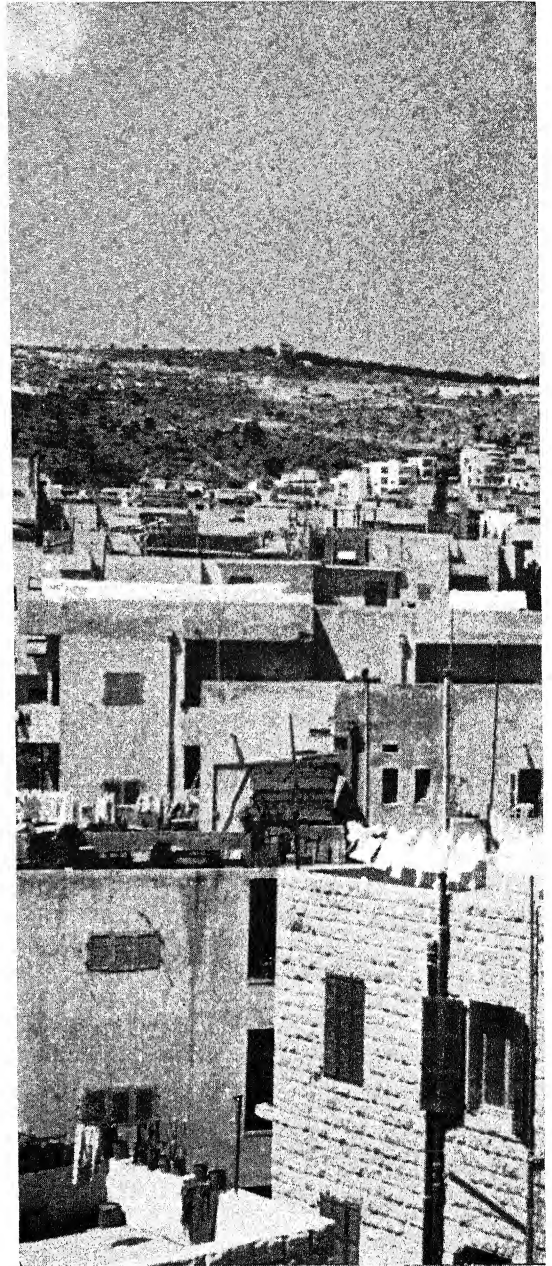


Photo BLACK STAR

unions and other institutions concerned with building, in order to turn this chance into a success and to achieve the desired goal.





Haifa towards Mount Carmel



## The Textile Industry

In 1929, when we began to investigate the possibilities of erecting in Palestine a cotton spinning and weaving plant, there existed already something like the beginnings of a textile industry: the Delfiner Silk Weaving Plant on the Tel Aviv beach mentioned in the Palestine guide books of the early post-war years, two small cotton weaving plants, one of them likewise in the vicinity of Tel Aviv, the other at Gedda in the valley of Esdraelon, and some hosiery factories concentrated in and around Tel Aviv.

The names of a good many of them are trade marks to-day, well established in Palestine and the neighbouring countries; at that time, however, all these young undertakings were struggling against almost insurmountable difficulties. They were under-financed and under-equipped, working with insufficiently trained labour, without backing, and without protection against foreign competition. Even the old-established Arab hand weaving industry around Gaza and Majdal in the south of the country was on the decline. Such an economic situation did not offer a very promising outlook to a spinning mill that was to depend on those undertakings as its prospective customers.

But the need to create fresh fields of employment, especially during periods of crisis, kept interest turning towards the textile industry despite the conditions just described. We were not alone in studying textile possibilities. Oscar Cohn, a well-known industrialist of Poland at that time, was making far-reaching plans which, unfortunately, were to be frustrated by unforeseen political and economic changes in Poland and his untimely death.

### Raw Materials.

Out of a wide range of raw materials and fibres cotton was considered of first importance. Owing to its vicinity, Egypt, which grows the best varieties of cotton, offered a most suitable source of supply, as it was then successfully renewing its efforts to improve the quality and yields of its cotton crop. Egyptian cotton

had just begun to gain a foothold in the European market and to compete with American cotton in lines even where, in former years, American cotton had been exclusively used on account of its lower price.

Transport facilities were plentiful. Besides the direct railroad from Alexandria to Haifa, and steamers regularly plying between Egypt and Palestine, barges and, eventually, lorries offered cheap carriage.

The Sudan and other African countries were looking for a market within easy reach for their increasing cotton crops, and Syria and the Lebanon, Palestine's neighbours in the north, were likewise endeavouring to improve their crops.

Incidentally, Palestine too, was a cotton growing country in the last century. The older travel books (e.g., H. B. Tristram, 1865), repeatedly refer to cotton as one of the staple products of the country. As late as 1923 I myself found cotton which was grown near Jericho being worked on two mule frames in the old Lodzia factory. At the same time pioneers of Beth Alpha, in the Valley of Esdraelon, preparing new fields, found remnants of earlier cotton plantations. And it is a curious coincidence that in starting the erection of our factory buildings we found rusty parts of old agricultural machinery and, upon inquiring about their origin, were told that just before the Great War a Belgian company had tried to grow cotton on that very spot.

As to other raw materials for the textile industry, promising attempts have been made to cultivate hemp in the Hule district; and its post-war industrial exploitation is expected.

Another vegetable fibre is Sisal, which is imported from India and East Africa and was introduced more than fifteen years ago, to be made into twines and cord for packing purposes by the citrus and agricultural industries. During the war large quantities of Sisal ropes were manufactured for the Navy.

As to animal fibres, the spinning and weaving of wool and goat hair is still being done by the Fellaheen and Bedouins in the same way as in

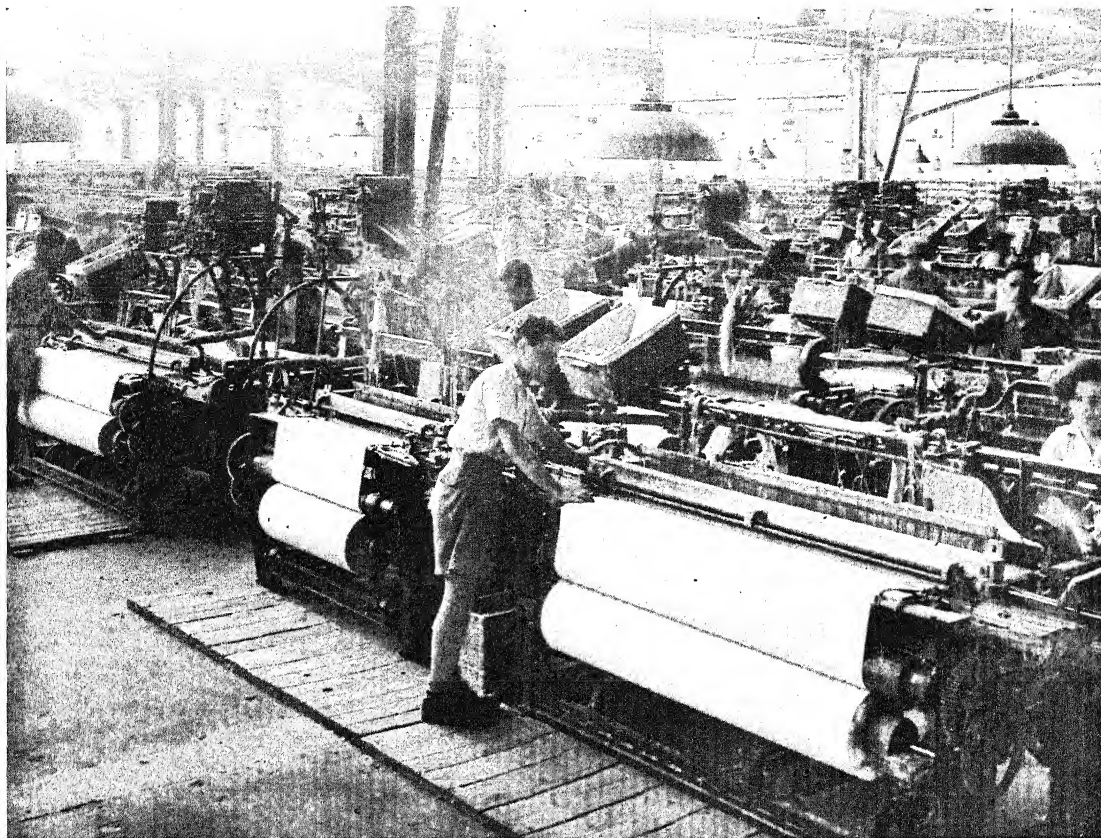


Photo BERNHEIM

Ata Textile Co. (Weaving)

the times of the Patriarchs, the wool being used for their garments, and the goat hair for their famous waterproof black tents.

Unfortunately, Palestine wool is of a very poor quality as sheep have, so far, been mostly bred for meat and the existing pastures, with their many thistles, spoil the fleece. Lately, however, experiments have led to a certain improvement and it may be expected that grazing in orange groves and on cultivated pastures will turn out a success. In any case wool spinning and weaving might be based on imported material as in many other countries.

Other animal fibres available on the spot are camel hair used in the manufacture of carpets, blankets, etc., and natural silk, considerable quantities of which were produced in the Lebanon until the competition of artificial silk made sericulture an unprofitable business.

Synthetic fibres have so far not been manufactured in Palestine, and it is not easy to say what kind of post-war development we are to expect. It may be presumed, however, that by-products of the existing oil refineries will play a part as the basis of new kinds of synthetic fibres like Nylon. It is further not unlikely that Palestine, with the realization of schemes like the Lowdermilk Jordan Valley Plan, will be in a position to produce such quantities of cereals as to exceed the needs in foodstuffs. And if the awakening Arab countries will, as we hope, concentrate their energies in restoring the fertility of their devastated, though once flourishing lands, like the Hauran and Mesopotamia, they might be able to produce grain in abundance for use in the manufacture of alcohol as basic material for many kinds of synthetic fibres.

The Middle East and Palestine in particular belong to the more favoured regions with regard to climatic conditions suitable not only for agriculture but likewise for industry. Owing to the fact that the temperature drops below freezing point only in exceptional cases, and never mounts so high as to be detrimental to the capacity to perform physical work, factory buildings can be of lighter and cheaper construction than in most other countries. On the other hand, as most of the textile fibres are very sensitive to variations of temperature and humidity of the air, it is not possible altogether to forgo either heating or air conditioning. During certain periods, mostly during May and October, when a south-eastern wind blows, known as 'Khamsin,' which makes the relative air humidity drop to 15 per cent. or less, artificial humidification is indispensable, otherwise all processing of fibres becomes impossible. The character of the 'Khamsin' is not yet sufficiently explored. Besides the extraordinary dryness a perturbation of the electrical status of the atmosphere and insufficient ionization can be observed. Thorough and extended investigation and research work still remain to be undertaken. Up to the present we have not got beyond finding out that work is made possible if the air humidity is artificially increased by the pulverization of water.

So much for the physical conditions of manufacture.

#### Marketing Possibilities.

To consider the marketing possibilities we had to take into account a population of one-and-a-half million, of which one million were Arabs and half a million Jews. Government statistics showed that the consumption of cotton goods averaged three kilos per head per year—a relatively high figure as compared with consumption in European countries, and constituting a sound basis for a fair-sized plant of about 50,000 spindles capable of feeding about 1,000 looms, apart from an appropriate knitting industry.

Planning for the spinning section was comparatively easy because given Egyptian cotton

as raw material, medium counts of cotton yarn between No. 10's and 40's with an average of No. 18's, had to be made the main product suitable for the manufacture of the better part of all cotton piece goods and underwear needed in the country. Spinning of coarser counts and of waste for special purposes, as well as of combed yarn required in the manufacture of sewing yarns, ladies' stockings and high quality shirtings such as poplins, could be left for later production.

It was, however, very difficult to decide on the kind of cotton goods to be produced. The big Arab market demanded cheap, mostly striped and highly coloured goods, while, on the other hand, that part of the population which had come from Europe made greatly differing demands as to quality and design. Moreover Palestine was an open market for the industry of the world at large, almost unprotected against even the most unfair dumping, as custom tariffs amounted to 10–15 per cent. *ad valorem* for cotton piece goods, and cotton yarns were entirely free. Then most of the European countries in their need of sterling, and unable to export to the protected markets of the United Kingdom or the United States, were eager to sell to Palestine even at a considerable loss.

Now, starting with the production of cheap goods was out of the question, because Japan sold such goods at about half the cost price of the local production. High quality goods, on the other hand, were too varied to make efficient production possible with a relatively small plant. So we started with 'good quality at cheap prices,' avoiding luxury articles as well as rubbish, and cloth for work in town and village and for the household became our main product.

Two circumstances came to our aid. First of all the willingness of the Jewish population, especially the workers, to buy locally produced commodities rather than foreign goods even at a somewhat higher price, provided they were of good quality, and, secondly, the trend to wear khaki—an article lying in our line—which was rapidly spreading to the Jewish and Arab population of Palestine alike.

Although it was difficult as already mentioned to make articles suitable for the Arab market



Photo BERNHEIM

Textile Printing

as to design and at prices competing with the Japanese production, we found that if Arab customers had once got used to our goods they remained loyal customers throughout, even under the threats against buyers of Jewish products by political agitators during the disturbances.

Unexpectedly an export market opened for cotton yarn and piece goods in Syria and the Lebanon, in Turkey and Roumania. This was due, it is true, to the currency and trade restrictions which had sprung up between those countries and their former suppliers. Thus a curious situation arose: while our products were almost unprotected in Palestine itself,

they were protected against foreign competition in the Lebanon and Syria where, owing to a special treaty between Palestine and these countries, our goods could be imported free of duty. With the outbreak of war, however, exports became impossible. Moreover, Palestine soon needed for itself all that could be made in the country. Shipping and supply of goods growing increasingly difficult, the authorities began to look upon the Middle East, and Palestine in particular, as a potential source of supply; and in time local production, stepped up by every available means, began to multiply despite the difficult conditions of wartime.

In expressing an opinion as to the future

prospects of exportation one must take into account the fact that all the countries which, before the war, had been taking Palestine textile products, have since then been encouraging the development of textile industries of their own.

#### Labour.

The main difficulty we had thought we should have to face was labour. While skilled workers were not available in the country at that time, immigrants without the least training had to be paid wages far above the European average. Many voices had been raised in warning that the main factor of an efficient textile enterprise lay in the skill of its workers. In all the new States created in the Balkans and the Baltic Provinces after the Great War which endeavoured to become independent and self-sufficient, textile industries had been created. And everywhere those young industries had had to call in foreign skilled labour, mainly Czechoslovaks, and in some cases Italians with a sprinkling of Germans. Foreign technical managers, foremen, spinners, weavers and dyers had been brought over and they frequently had not succeeded in training the local population to such an extent as to guarantee the smooth running of the plants, so that in many cases entire groups of foreign workers had to be engaged and settled for permanent work. Those factories suffered from frequent breakdowns and exorbitant repair work and maintenance costs; and huge stocks of repair and maintenance parts had to be kept in store. It has been stressed that a textile industry can prosper only where labour is available derived from the old craft with a tradition handed down from father to sons, and it was asserted that textile industries had developed only in districts where the soil could not sustain the population and where no other means existed of making a living and cheap labour therefore was abundant. And so we were warned that we would have to rely upon skilled foreign workers and cheap Arab labour. We tried to tackle that embarrassing problem by training prospective immigrants in our Czechoslovak factory. A group of young members was selected by the Czechoslovak

*Maccabi* Organization. By their genuine interest and willingness to work they soon succeeded in gaining the confidence of the Czech foremen and workers, who willingly taught them the tricks and intricacies of the various trades. When, in 1935, the first machines were set up in Kfar Ata by non-Jewish fitters from our Czechoslovak plant, those young people were already able to take an active part in the work and in the running of the machines, and they became the nucleus of our technical personnel. This first experience with our first Jewish workers was not exceptional. Very soon we were in a position to release our Czechoslovak foremen for return home. Since then all the subsequent work connected with the extension of the factory and the introduction of fresh lines and of new, frequently complex and delicate machinery, has been carried out by our own people.

In accordance with our traditional policy, new workers have been accepted exclusively through the Labour Office of the General Federation of Jewish Labour (*Histadruth*), with whom we made a general agreement, the main parts of which are still in force. The young girls from the surrounding settlements, who had never before been inside a factory, proved extremely clever and eager to learn in training for their new job. After three or four months they could be given jobs girls in Europe had not been entrusted with under two or three years.

To-day we are justified in stating that the Jew, from whichever country or former trade he may have come, is capable of becoming a very good industrial worker, because operating modern machinery calls more for intelligence, adaptability and accuracy than for routine.

We have been able to rely upon the average workers as well as upon their representatives for a full understanding of the necessity for production with the highest possible efficiency, and not once have they failed us in their readiness to co-operate. Often the initiative has even come from them.

So what originally had been considered the greatest difficulty – the Jewish worker – has in fact become our greatest asset, and this opens a fair prospect for the post-war development of the textile industry in Palestine.

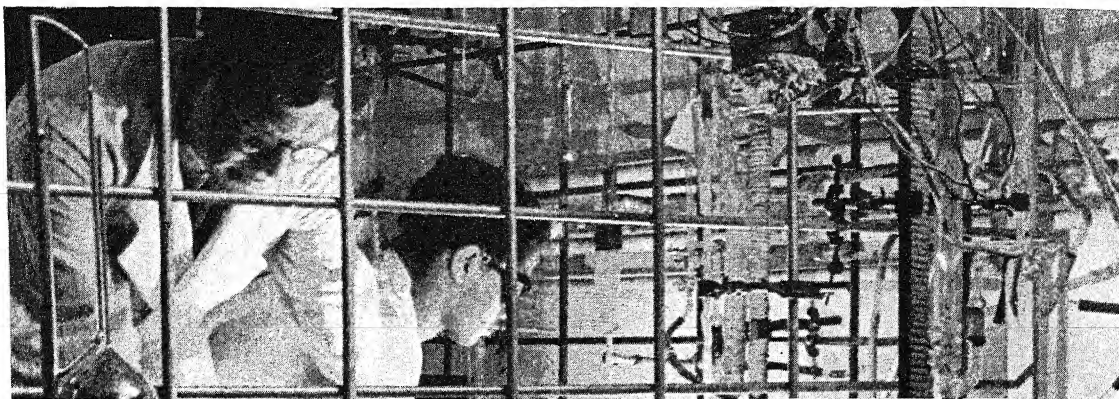


## The Chemical Industry

The World War confronted the young chemical industry of Palestine with the problem of satisfying the urgent demands of the civil population of Palestine and also of the neighbouring countries, as well as that of the allied military forces of the Middle East and of finding substitutes for the greater part of chemical products previously imported from Europe and the United States of America. Thus within a short time a considerable branch of industry was established which successfully undertook the manufacture of the most varied chemicals, from shoe-cream to synthetic malaria remedies. Despite the extraordinary difficulties from outside conditions it was enabled to meet current demands. In this way, besides the already existing factories, a large number of additional plants were established—which, in a more or less perfect degree, produced raw materials, auxiliary products and finished goods; so for the duration of the war they justified their existence. It must, of course, be assumed that with the return of normal conditions, a great number of these, mostly small and improvised plants, cannot continue to be competitive and must thus close down, unless they become successful in maintaining themselves in the industry by the introduction of new products and by far reaching rationalization of their manufacturing methods. The maintenance of the present day position of our industry depends upon careful planning and intelligent limitation, in such branches of the industry as are within the scope of the possibilities of a small country, the strength of which must be more inherent in the production of high grade specialities, than in the more extremely rationalized production of heavy chemicals and materials dependent upon large turnover and cheap raw materials. The particular economic and political conditions of the Middle East do not seem to make it advisable to enter into open competition with the powerful foreign mass production industry, to which at least for the time being we must be subject in every respect, since we have neither sources of raw materials, nor sufficient production capacity or State assistance available in order to enable us to compete against the prices of world renowned

firms. We must concentrate our chief efforts upon the further development of an industry of fine chemicals, medicines, and other specialities in which the value of labour and quality of workmanship make the cost of raw materials rather less important. In such production, in the first place, an advantage is to be derived from the knowledge acquired during the past years, as well as from experience in technical developments. A large staff of well trained technical workers and technologists has been created, of whose capabilities we should make the fullest use. More than ever the necessity of a close co-operation between our scientists and our industrialists should be emphasised. We must endeavour to make the quality of our products conform to the highest standards and stages of modern research and technique. Seeing that our pharmaceutical products may be considered the best developed branch of our chemical industry, which during the war built up a sufficiently strong financial foundation, mainly by copying well known medicines that formerly were imported from abroad, it must now be its main task to turn out new and original products and thereby maintain its capacity for existence and its justified good reputation in world competition against bigger competitors. At present the synthetic branch of our pharmaceutical industry is still in its infancy, yet in this sphere a wide field of expansion is available for the inventive faculty and skill of the soundly trained industrial chemist. We are compelled to rely upon the capacity of our scientists and technicians, because the future of our industry is based upon the initiative and originality of our manufacturers and their experts. Hence the development of qualified chemical study is of particular significance, and it is important that students should be able to keep in touch with the methods and systematic proceedings of foreign science and industry.

We have of course at our disposal a number of research institutes which, particularly during the war years, have in a far reaching manner supported our young chemical industry. These are now prepared to undertake new tasks and to



Scientific instruments, "Phoenicia" Jerusalem

Photo BERNHEIM

pursue research work, devoted to further practical purposes beneficial in the development of the industry. A planned collaboration with chemical and pharmacological institutes is absolutely necessary for pharmaceutical manufacturers. This also means the provision of an adequate endowment for research purposes, which can be supplied by the manufacturers, in order to maintain further the quality of their products at an up-to-date standard. It must be our aim also to maintain in the future our present good reputation in the Middle East and to occupy the position which by the stoppage of German products has become vacant. The collaboration of our scientifically trained and educated medical men, who are interested in all progress, guarantees to the public a selection of valuable products, equally as good as the foreign products. Nevertheless a serious problem is presented by the competition with English and American firms, because, whilst in quality we are not inferior, we may be behind in make-up and prices. In any case it would be advisable for us to arrive at an understanding with foreign firms, to whom it should be of great advantage to have our knowledge of local conditions in the Middle East and of the particular requirements and wishes of the various consumer classes. Besides, it is very probable that they may also welcome our co-operation. The further treatment of imported semi-manufactured goods, on behalf of foreign firms, would offer good employment for a considerable number of our skilled workers. A favourable development presents itself for commodities from textile auxiliary products, such

as: net medicates, textile soap, special colours, impregnating substances, etc. Also an increase in the production of synthetic insecticides is anticipated, as the Orient recognises its value more and more in the development of an up-to-date agriculture.

The exploitation of the oil products available in the country would naturally offer a basis for an organic synthetic industry of greater scope, but so far, in this case, we are short of nearly all necessary materials.

The production of solvents, such as acetone, butyl alcohol and alcohol, which during the war rendered such important services, should in the future be profitable, as the home demand of the country is not insignificant while with cheap raw materials the plants can also produce at low costs. To summarise, it can be said that the chemical industry of Palestine will continue to constitute an important factor in the economic life of our country and can employ a large amount of labour. This is based on a clear recognition of local conditions and the existing circumstances of the economic status of the Middle East. In other words, it means the selective production of those specialities in which quality and originality of design and execution will pay well. As Switzerland has by its own endeavour and efficiency succeeded in building up an excellent chemical industry in spite of the deficiency in most of the raw materials, so we can also attain, on the basis of our abilities and knowledge, within reasonable time an up-to-date and efficient chemical industry which would hold a leading position in the whole of the Orient.

## The Diamond Industry

Most industries are attached to particular regions. In any economic atlas one can see how industries have been established and developed in definite topographical areas. The economic examination of these areas deals with all those relevant factors which led to the choice of a particular location by a particular industry.

Broadly speaking, the location of an industry depends upon the following factors:

1. The presence of raw materials and the most important additional materials which are necessary for the manufacture of the final product, e.g. ore and coal for the iron industry.
2. The distance to the centres of consumption.
3. The technical suitability of the labourers and the cost of labour.
4. The initiative and organizational qualifications of the entrepreneur and manager.

Factors 1 and 2 are a matter of the cost of transport facilities. In all cases where these costs are negligible, owing to the product being of high value, the first two factors have no longer any bearing on the location of the industry.

As a classical example the diamond industry can be quoted. It developed mainly in Europe, although for all practical purposes the raw material does not exist on that continent. The transportation costs from the source of the raw material to the production centres and from there to the countries of consumption of the final product are, in the diamond industry, so negligible as factors of general production that the first two factors have no bearing at all on the location of the industry.

Therefore, it is understandable that Palestine, a country poor in raw materials and on the other hand a country of immigration, has to establish within its borders those industries for which the first two factors are not important. That was the reason why Palestine seized with such vigour and hope the opportunity to build up a diamond industry.

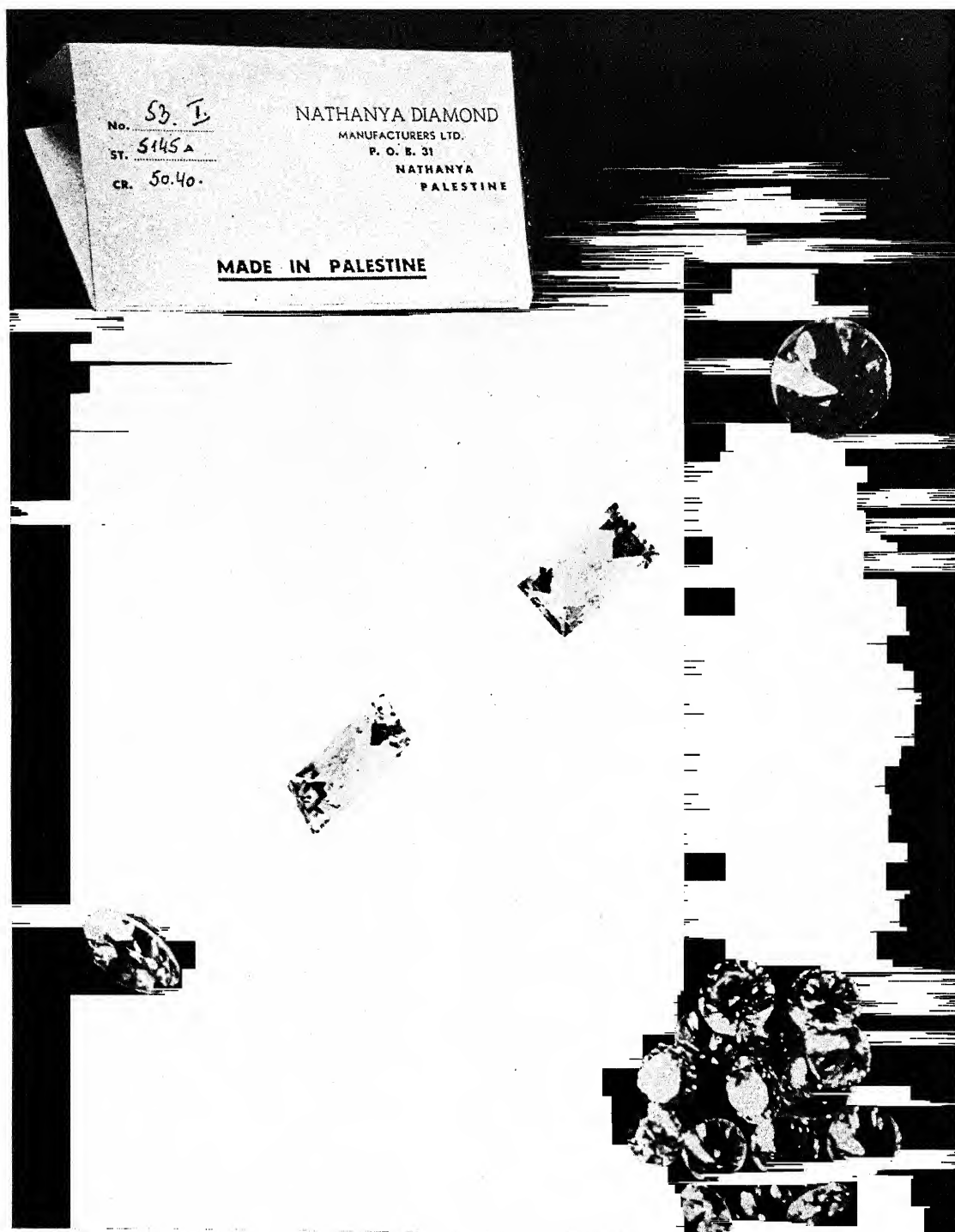
Some of the preliminary conditions had first to be created. There was, in the first place, the supply of the raw material. The distribution of raw diamonds, apart from a small percentage,

is in the hands of the Diamond Trading Company, London (the so-called 'Syndicate'). Therefore, the first task of the promoters of the Palestine diamond industry was to secure the supply of raw materials from the Diamond Trading Company. The situation was as follows: The main centres of the diamond industry were situated outside the British Empire (in Belgium, Holland, Germany). During the war on the European continent the distribution centre of raw materials was cut off from the centres of manufacture. During the first world war, the Diamond Trading Company was unable to dispose of the quantities of raw material, which normally were sent to the Belgian diamond industry, owing to the lack of a diamond manufacturing industry inside the British Empire or in the British sphere of influence. The initiative coming from Palestine at the outbreak of the second world war to establish a diamond industry there could therefore only have been welcome to the Diamond Trading Company.

This circumstance was linked with a second weighty argument: although the Diamond Trading Company did not directly supply Germany with raw materials in peace time, a considerable diamond industry had been developed there, employing approximately 8,000 workers during peace time (*Hanau*).

The German diamond industry, actively supported by the German Government, received its raw material from Belgian and Dutch dealers and manufacturers. If, therefore, a diamond industry were to be established in Palestine, such industry could occupy the place formerly held by Germany.

It may be assumed that it was these two factors that influenced the Diamond Trading Company to facilitate and encourage the establishment of a diamond industry in Palestine by promising a regular supply of raw diamonds. The Diamond Trading Company having promised the supply of raw materials to Palestine, it was now necessary to pass the test regarding the third and fourth factors enumerated, which, as mentioned, are of vital importance for the seat of an industry such as the diamond industry.



Diamonds made in Palestine

Photo HIMMELREICH

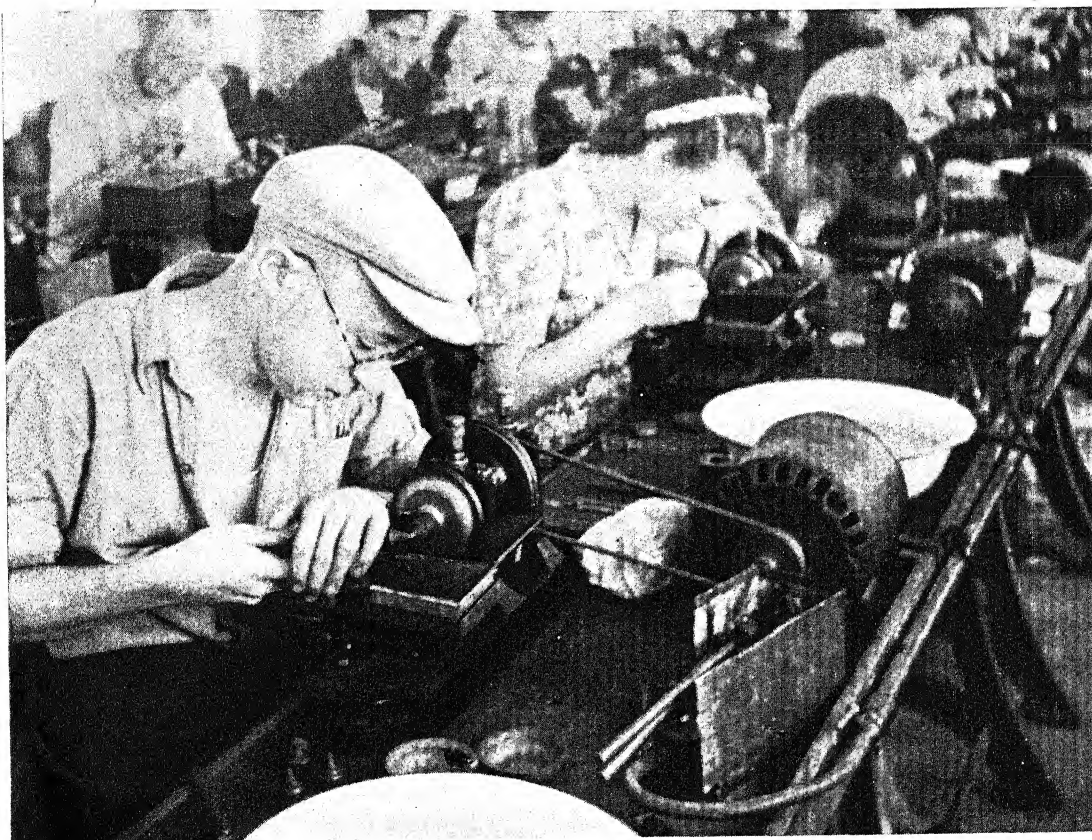


Photo BERNHEIM

Diamond Workshop at Tel Aviv

An extremely small number of Belgian-Jewish experts, who had migrated to Palestine, started even before the outbreak of the war to work up diamonds in Palestine, with a limited number of apprentices recruited from among local Jewish youth. This was a very modest beginning: the raw material was supplied by the Belgian industrialists, and the semi-manufactured product returned to them. Only in the first half of 1940 did the start of what can be called a diamond industry take place. First and foremost the machines and implements for working up diamonds had to be provided. The samples available were scarce. The machines could not be imported on account of war conditions. There was scarcely a machine-producing industry in Palestine. Notwithstanding all these difficulties, the Palestine diamond industry can pride itself on the fact that all machines and

implements have been manufactured in the country and that they are not inferior to European models either in quality or precision. From these small and modest beginnings emerged the rapid boom of the Palestine diamond industry.

The Diamond Trading Company—the only raw diamonds supplier—also exercised a decisive influence on the types of diamonds worked up by the Palestine diamond industry. In the diamond industry there are—disregarding forms which may for the present purpose be ignored—three basic types:

1. Single Cut, 8/8.
2. Melees Full Cut.
3. Sizes.

The first type is a stone, with 8 double cuts, which is produced in the size of some 25—300 stones per carat. The second type is a full cut



with 56 cuts ; it is produced in the size of 4—25 stones. The third type is a full cut with the same cuts as 2; the size of the stone, however, is 1 carat or more.

At first, the Diamond Trading Company supplied raw materials almost exclusively for the manufacture of single cuts. This type was produced, before the war, mainly in Belgium; and since Belgium—on account of the war—ceased to exist as a centre for the working of diamonds, Palestine was able in a relatively short time to become the chief producer of this type. The quality of the Palestinian products was continuously improved and to-day the Palestine Single Cut enjoys a very high reputation and is considered as the best from the point of view of quality, in comparison with other single cuts produced in countries such as Cuba and Brazil.

#### Training the Workers.

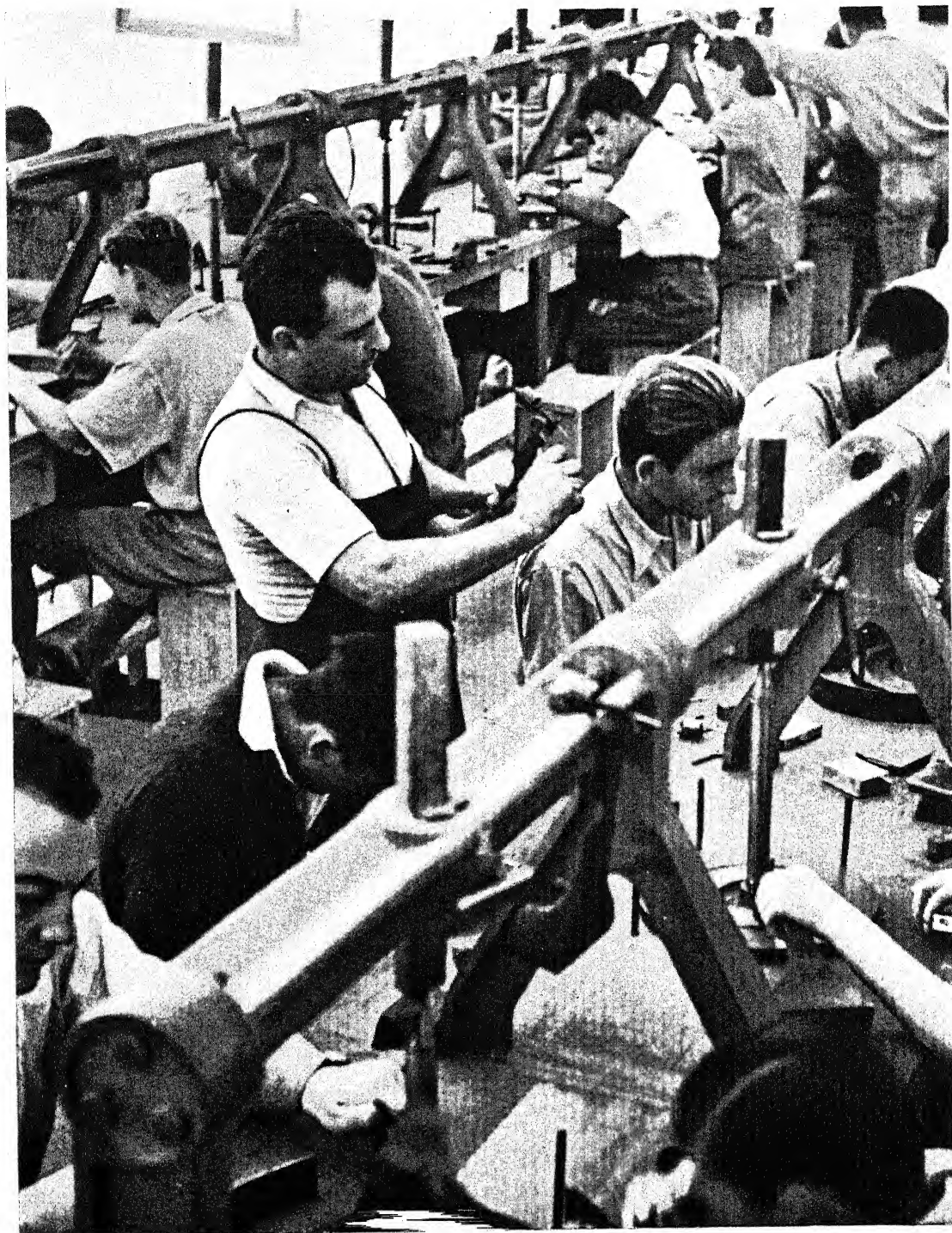
At the end of 1943, the Diamond Trading Company pointed out to the Palestine diamond industry that it was no longer in a position to provide sufficient raw materials for the ever-increasing production of single cut and that Palestine would have to switch over to the second type, i.e. Melees Full Cut. The infant Palestine industry believed itself to be already facing a serious crisis. Would the workers, young and trained only in single cuts, be able to switch over to full cut with the necessary dexterity? Would industry be in a position to raise the higher capital which such switching-over would necessitate (more and more expensive goods per working hour)? Would markets be found for the considerable increased production in carats? It can now be stated that the Palestine diamond industry passed the test with flying colours. A large number of the workers was gradually and systematically transferred from single cuts to full cuts. Since 1944, the production table shows a rising curve for production of Melees and a declining curve for production of single cuts:

Year	Percentage of Single-Cuts	Percentage of Full-Cuts
1943	70	30
1944	40	60
1945 (first half)	30	70

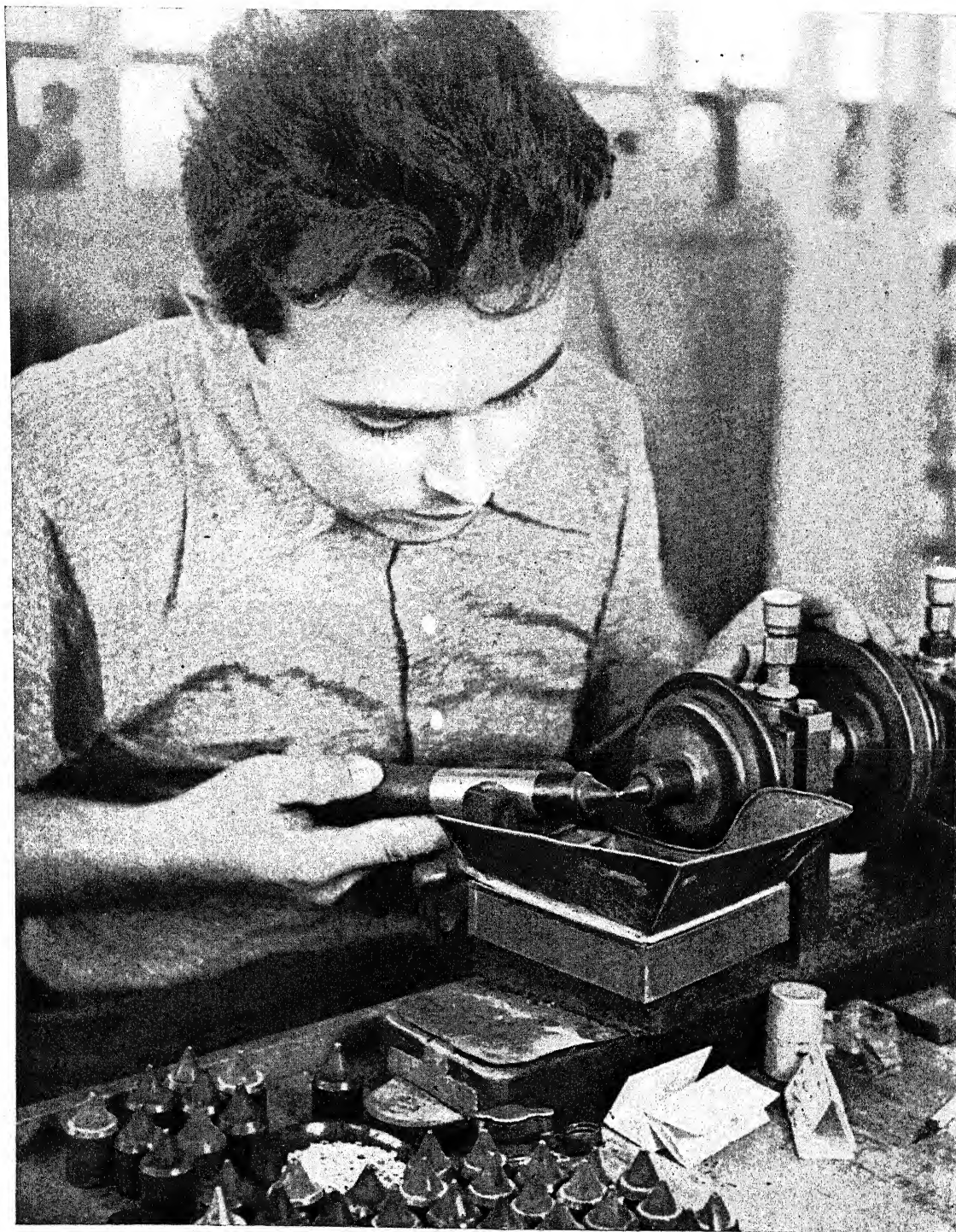
With the assistance of the Palestine banks, the



Photo JEWISH AGENCY FOR PALESTINE



Palestine's new diamond industry established at Tel Aviv and Nathania



Polishing diamonds

*Photo KEREN HAYESOD*



industry raised the requisite capital. A few figures concerning the import of raw diamonds into Palestine illustrate the procedure clearly.

#### Import of Rough Diamonds.

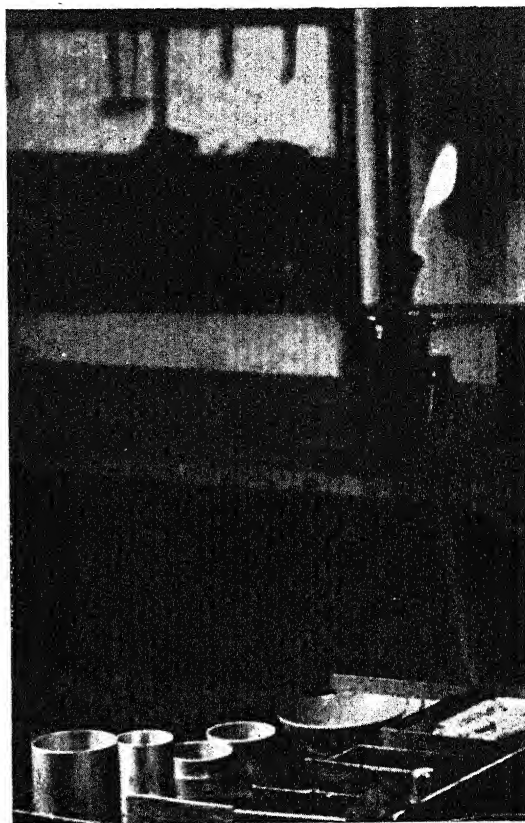
Year	£
1940	30,700
1941	153,500
1942	372,000
1943	1,139,000
1944	1,560,000
1945 (first half)	1,200,000

If America was the chief market for single cuts, other outlets had to be sought for Melees, since America produces its own Melee. The war has eliminated almost the whole of Europe as a market for diamonds. Hence, apart from America, India, Canada, Australia (as long as the import of Palestinian diamonds was permitted to Australia) and the Near East, were chiefly supplied. The conversion of the Palestinian industry from an exclusively single-cut, to a mixed single-cut and full-cut production may be described as successful.

Quite recently the Diamond Trading Company has agreed to supply Palestine with raw material for a third type, namely, large stones. The production of these stones is now being commenced and the preliminary experiments may well warrant entertaining the hope that Palestine will emerge successfully from this initial test in the production of these stones as well.

#### Raw Material Problem.

Broadly speaking the main difficulty of the Palestinian diamond industry is the acquisition of raw material. Except for a short period in the beginning, the industry has throughout suffered from a shortage of raw material. This shortage is suspended like the sword of Damocles over the heads of both the entrepreneurs and the workers, whose livelihood depends on the working-up of diamonds. The raw material supply situation became so critical in the second half of 1943 that the Government was compelled to issue an order prohibiting the establishment of new diamond factories and the extension of existing ones, since even the existing enterprises were not in a



Special instrument designed at the Hebrew University

position to assure full employment to their workers. Despite the powers of adjustment of both industrialists and workers, the raw material problem has not ceased to menace the industry. The diamond manufacturers throughout Palestine are united in the Palestine Diamond Manufacturers' Association. This Association was formed upon the advice of the Palestine Government and the Diamond Trading Company, as it was demanded—for purposes of control necessitated by the war—that the individual factories should purchase their raw material through and under the control of a representative organization. Headed by its energetic President, Mr. Ben-Ami—to whose credit are many major achievements in connection with the creation of the diamond industry in Palestine—the Association has effected its purchases, and has become the liaison authority between the Diamond Trading Com-



Working on diamonds at metal disk

*Photo GIDAL*

pany and the local industry. This circumstance is also responsible for the fact that the local industry—contrary to the Belgian and Dutch ones—is not concentrated on home employment, but all its operations are carried out on the factory premises. These enterprises purchase the requisite raw materials from the Diamond Trading Company through their association, carry out all the phases of the production on their own account and at their own risk and distribute the finished product direct to the buying centres.

#### Wages and Man-Power.

As customary everywhere in the diamond

industry, the remuneration of the workers is based on piece work. The piece-wages are based on the experience accumulated for each kind and size of stones and are exactly calculated for each phase of work. The tariff is based on the basic salary, and the cost of living allowance is adjusted to the index of cost of living from time to time. Since, as mentioned above, the manufacturers are organized in an association and since they are allotted the same raw materials through this association, it was easy to arrive at a collective agreement with the well-organized workers of Palestine. There is scarcely any other industry in Palestine which has arranged all the problems of the workers—questions regarding wages, social problems, etc.—as



collectively and uniformly for all the labourers as the diamond industry. The diamond manufacturers are proud to be told frequently by the workers' organizations that the diamond industry was a pioneer in many social achievements of the working class. Here it may be mentioned that altogether the Palestinian working class is anything but lagging behind in this respect. It is the more significant if such praise is bestowed by the workers' organization. The workmen of the Palestine diamond industry are composed of all sections of the Jewish population: old settlers and new immigrants, Ashkenazi and Sephardi Jews, Jews from Buchara and the Yemen (the two latter especially adapted to this kind of work). Another circumstance should not be left unmentioned: in Europe the Jews were represented relatively numerous in the diamond industry. In Palestine it is the special merit of the diamond industry to have absorbed a great part of the strictly orthodox population, who otherwise would have had to fall back upon extremely badly paid religious occupations or would have lived their lives in penury. The diamond industry has helped these people to acquire a well-paid trade.

At present, Palestine employs some 4,000 workers in the diamond industry and in the allied industry which manufactures implements for the diamond industry. Since, as stated above, wages are paid per piece and not per day—the extent of income of the individual worker depends on his dexterity and his experience—average figures would not illustrate the wages situation. However, in order to convey an idea of the amount of wages of the workers, the following figures are given:

The average worker, who is paid from the first day that he starts work, receives after one year about LP30 per month, after three years between LP50—60, while especially skilled workers make LP100 and more. It may be presumed without exaggeration that the Palestine diamond factory is paying out some LP2,500,000 per annum in wages and salaries, an amount which represents for this small country a great economic stimulus. As almost the whole industry is working for export, the economic value of this amount is enhanced, as actually it is raised abroad.

## An Important Industry

The importance of Palestine's diamond industry for the commercial budget of our country cannot be valued high enough, since for many years now the citrus plantations have ceased to be a factor drawing foreign currency. The diamond export is one of the biggest foreign exchange assets of our country. In the years 1941-1944 Palestine exported diamonds to the value of approximately LP7,500,000. (LP3,500,000 in 1944.) According to the figures for the first months of 1945, an export of some LP5,000,000—6,000,000 can be expected. The whole amount is a foreign exchange asset, as no sums are being spent in foreign exchange, as for instance in the citrus industry, for the purchase of wood, paper, freight, etc.

The economic importance to the community of the diamond industry has been duly appreciated by the British and Palestine Governments. The Government has even appointed a special legislative body, the Diamond Control Board, composed of official and non-official members, under the Chairmanship of the Economic Adviser of the Government, Mr. G. Walsh, C.M.G., C.B.E. This board has to take legislative measures in connection with the import, working-up and export of diamonds.

Future prospects of the diamond industry, like all questions concerning the future, are difficult to assess. The Palestine diamond industry has to be aware of the fact that with free competition, resumption of the Belgian and Dutch industry, the ever-developing industry in U.S.A., Cuba, Brazil and Canada, it will have to pass its test, so as not to lose the position gained. It will have to protect jealously the good reputation of its products. It is to be assumed that the considerable capital invested in this industry as well as the switching-over of the 4,000 workers who look to the industry for their livelihood, will induce the industrialists and workers to adapt themselves to the newly created situation. The resultant economic importance of this industry for Palestine and the British Empire, it is believed, will cause the Government as well as prominent diamond circles in London, to offer to this industry the preliminary conditions that will enable the industry to become a permanent feature of Palestine economy.

## Precision Instruments Industry

Even if any evidence were needed of the general worldwide importance of precision instruments, the dramatic end of the war, brought about by the atomic bomb, provided the proof. It is quite probable that the fate of Hitler was decided, not by a battle, but by the famous bombing of the laboratory at Peenemuende, where thousands of scientists and mechanics were preparing the yet undisclosed secret weapons. Another instrument—the Radar—averted the invasion of the British Isles in the first period of the World War and radically changed the situation at a time when all other weapons of the Allies for the defence of the country were absolutely insufficient. Yet a generation ago, in the first World War, the importance of instrument technique was shown by many facts, so that after the 1914–18 war efforts were made in different countries to break the dangerous hegemony of Germany in this particular field.

It is important to realise that this hegemony had not existed for a very long period. Two generations ago hardly anyone who needed a precise instrument would try a German one, but would go to England or France to get it. A good watch was looked for in Switzerland, a telephone in Sweden, an electric instrument in U.S.A. and so on. Even in the field of optics, the situation was similar as far public requirements were concerned. I can remember, that for me, a young Russian boy fifty years ago, a French photographic camera and a French binocular were the ideal.

There was a complete reversal of the situation during the last fifty years. Germany, who formerly made only cheap goods of second quality, recognized that world markets could be won only by products combining originality with quality. She then found that originality requires considerable research and experiment, both costing much money. The solution was found in production on a big scale, so that piece costs could be reduced and pooled. This was a revolutionary idea at a time when the highest recommendation for a product was the claim that it was “hand made” and the word

“mass production” was identical with “third quality.” The new method proved to be very successful, especially in the field of optics. It required a long-sighted preparation. Schools had to be established to educate foremen, scientists had to be selected and re-educated for collaboration with technicians (not always easy to achieve), certain special difficulties, when dealing with big quantities of small parts in the production line, had to be overcome, and considerable capital sums had to be invested long before a return could be expected. Strangely, this extremely successful development was hardly followed outside Germany until after the great War of 1914–1918. When experience had shown that the production of precision instruments in large quantities was essential for defence requirements, various governments started working in this direction. In England, a Committee for photographic research was established; in France, an excellent “Ecole d’Optique” was created under the leadership of a famous scientist; and the biggest effort was made in Soviet Russia with the foundation of a scientific body with hundreds of collaborators. But on the whole the success was not great. It was not possible until the beginning of World War II to reach the norm of German production; still more, it was not even possible to prevent the import of German products in various countries in spite of the highest custom duties (up to 100 per cent. of the goods’ value in the United Kingdom and Japan, and up to about 50 per cent. in the U.S.A.).

It is therefore interesting to study what had to be done to introduce this specific industry into Palestine.

First there was the scope and definition of the industry. There is no common name in English for it. Sometimes, “Fine mechanics” is used, being a bad copy of the German expression; sometimes the definition is “precision work” for the same variety of articles. In recent years, the new word “Instrumentation,” nowadays supplemented by “Instrumentology,” has been introduced in the U.S.A.

and generally adopted. But these words do not cover the whole ground.

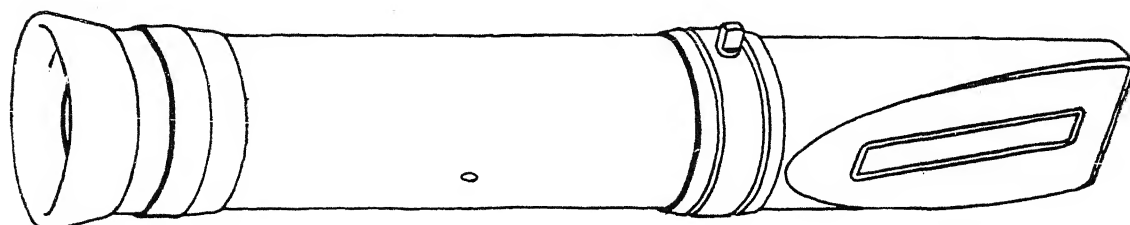
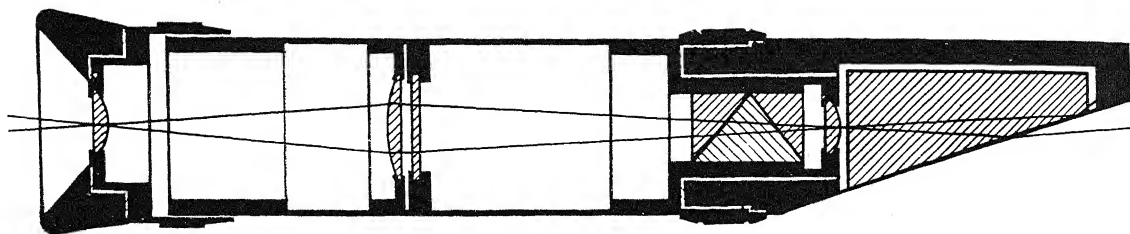
"Precision" itself is not at all essential for a definition of the products in question. A modern locomotive is as precise or preciser than a photographic camera, but nobody will put it in the same class of articles. The property common to the objects concerned is that they require intensive work to be applied on a small quantity of material. Thus a sewing needle, an incandescent lamp, a wireless set and a watch can be viewed from the same aspect. All have in common that the precision is high in comparison with the price they fetch. But there are other articles covered by this definition—such as astronomical telescopes, scientific instruments, etc., the price of which is not restricted, but which still require an enormous amount of work in comparison with the quantity of material involved. In all cases, long preparatory work has to be performed before starting production. A big house can be designed in a few weeks, in extraordinary cases in a few months; and there are few houses which collapse or do not serve their purpose because of this shorter preparation. On the other hand, the continuous work of a dozen designers during two years is often needed to create a new camera, and even then there is not one single case known to the author in which the newly produced article was correct in the first "edition."

The design of most of the objects in question requires the combination of a series of quite different gifts. Take as an example a modern photographic lens. To begin with, a knowledge of the market, that is of the existing types, together with personal experience in photographic technics or cinematography, is needed. Thus, the direction of the work is settled. Then a mathematician comes into the field, filling hundreds of pages with thousands of figures and equations during many months of work. Now a skilled man begins to transform the purely mental performance of the scientist into a series of shaped pieces of glass. The dimensions fixed by a mathematician must be followed with the highest accuracy known in modern technics, even for the cheaper kind of such lenses. It is enough to say that the normal tolerance, that is the deviation from the

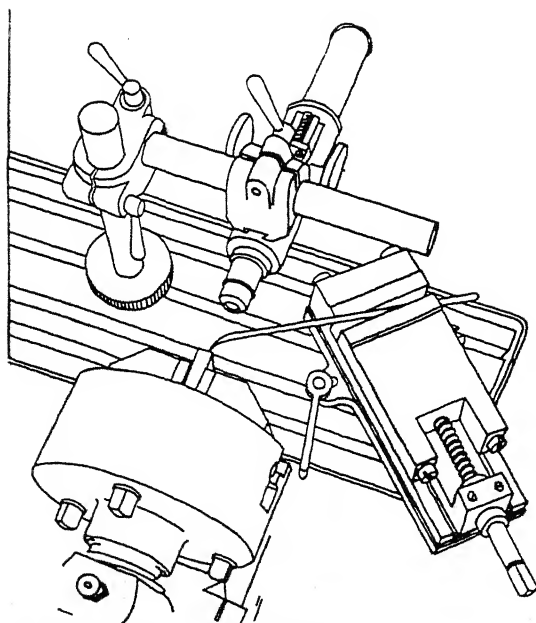
required magnitude, should not exceed one hundred-thousandth of an inch. Next, the mount for the lens (better to say for the lenses, because there are several of them in a modern objective) must be designed and made on machine tools of highest class, because the precision required in the optical parts of the work must be quite accurate.

This variety of work is typical for all objects of precision work. Everywhere the closest co-operation between the pure scientist, the engineer, the handworker and the salesman, not to forget the consumer, is much more essential than in any other field of production. This fact makes an establishment of such an industry a difficult task. There is no kind of scientific, technical or public activity in which special instrumentation is not needed. The CID men ask for a special apparatus for photographing finger-prints, a movie maker for better pictures, a surgeon for an instrument to inspect the interior of the stomach, the astronomer for a telescope by means of which he may penetrate into world space some millions of miles farther than his colleague. And the unfortunate designer of such implements must work as if he has never done anything else in his life but penetrate into other peoples' stomachs or chase stars.

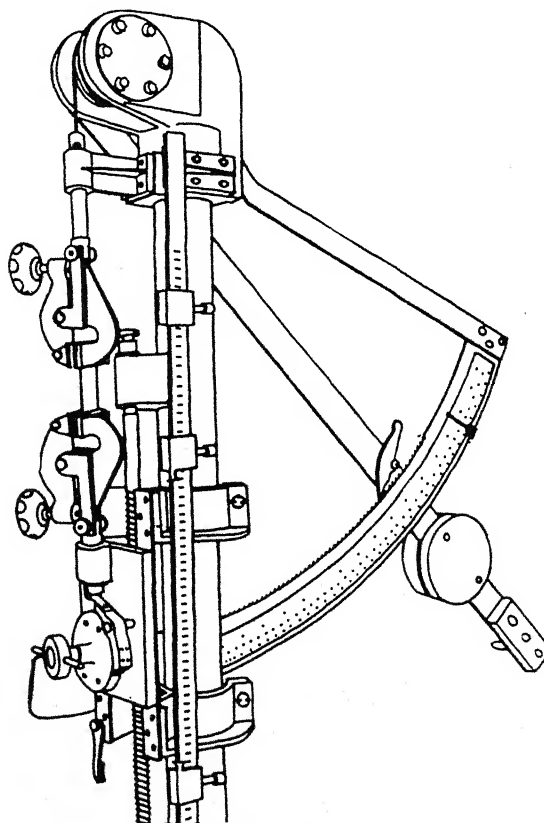
Such an industry seems to be eminently suitable for a country, which, like Palestine, has no sources of raw material (Dead Sea chemicals excepted) but which is full of men wishing to work. Unfortunately, purely negative factors are not sufficient to bring about positive effects. To be quite honest, it is not even true that the instrument industry is more or less independent of raw material, the quantities needed being very small. Yes, the quantity is small, but the variety required is enormous. Even a small instrumental workshop needs hundreds of different types of screws, tubes, sheets and materials of almost all possible kinds, beginning with diamonds, platinum and other precious metals, and ending with iron and wood. And it is easier to order a ship full with oil or pig iron than a postal packet with 50 different kinds of optical glass. No special importance need be attached either to the positive or the negative side. Much more important is the question of human material. The rapid de-



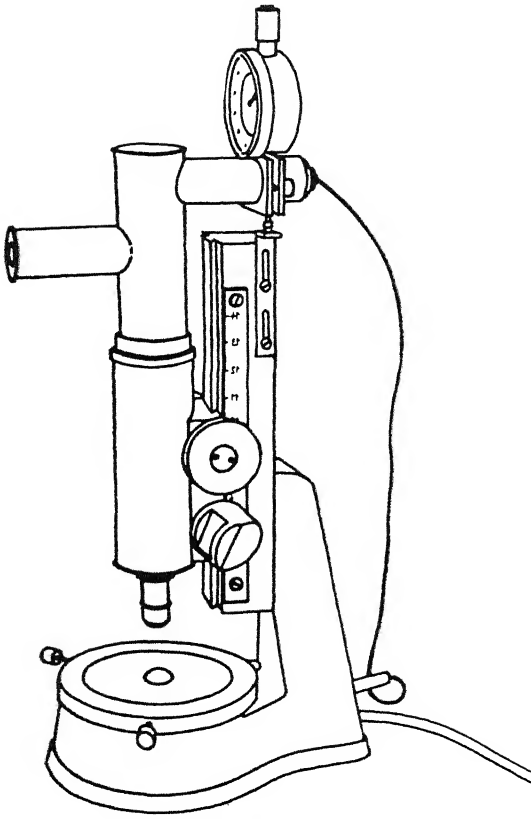
Refractometer for sugar content of citrus products



Microscope for use on machine tool



Testing machine for textile and rubber



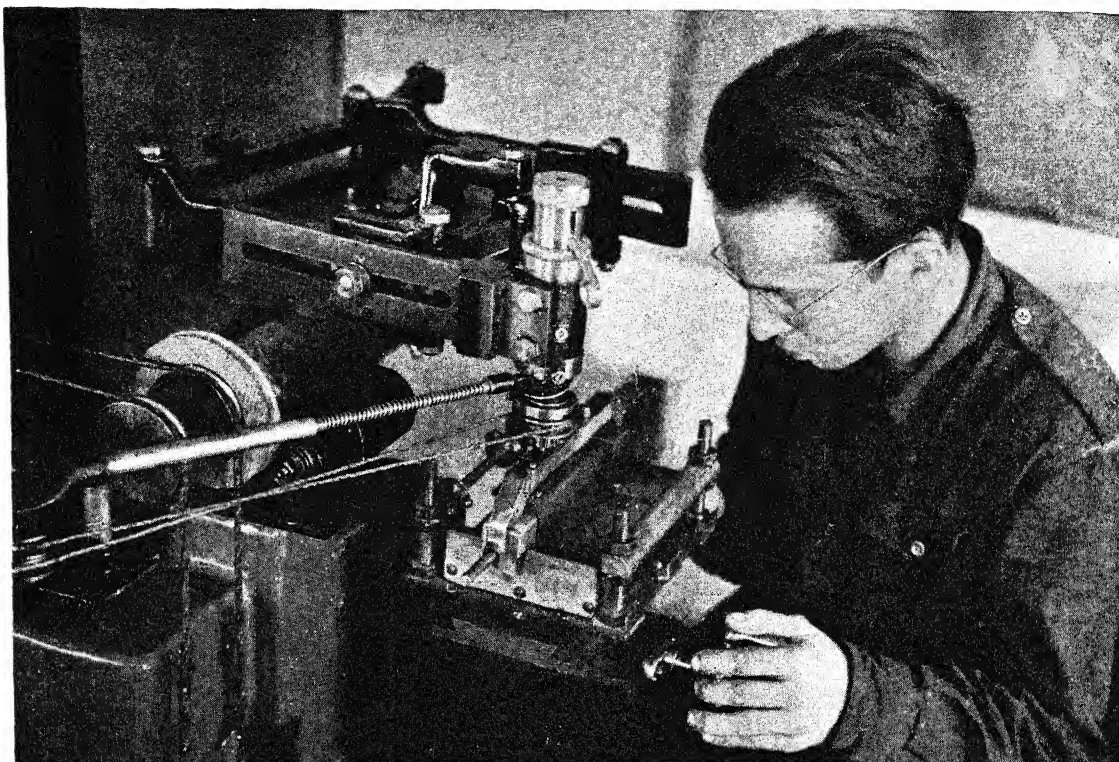
Testing instrument for optical surfaces

bilities of instrument production in Palestine. It shows that the Jewish worker has an eye for quality and that he likes to produce goods which are not only fit for the use for which they are made, but which are also well finished and suitably designed from the æsthetic point of view. These two qualities are decisive in instrument sale, and they were often completely overlooked by British and American producers when trying to compete with German-made goods.

The point reached shows that Palestine is theoretically suitable for the introduction of a precision industry, but much is still to be done to transform these potentialities into dynamic realities. This industry is founded, as just demonstrated, on the smooth functioning of a team of specialists in very different fields, scientists, engineers, highly skilled workers in various branches, etc. Even a superficial survey indicates that the number of such specialists at present available in Palestine is very scarce and insufficient to form an industrial team. This makes it difficult for an industrialist, interested in getting a quick return on the money invested, to start such an industry. On the other hand, as long as such an industry does not exist to some extent in the country, the younger generation is reluctant to be trained in the technics required, being afraid that there will be no chance for work when the training period is over or when for some reason the job is lost. This is a vicious circle, which has to be overcome in some way. The first difficulty, that of industrial enterprise is primary, and it must be solved in the same way as it has been solved elsewhere. National or public bodies must take the initial risk and bring the wheel into movement. They must create the first plants or subsidise them until the trade-mark "made in Palestine" begins to be respected in the instrument world; they have to pay wages high enough to give a decent living to the pioneer-workers; and they have to bear the losses incurred by the inevitable mistakes in finding proper designs and markets. They have to establish schools not only for prospective technicians and workers, but also for the training of instructors, who will then be able to transfer their knowledge to the young generation in the years ahead.

velopment of the Palestinian industry during the war has shown even to the most anxious pessimist that some hitherto unknown potentialities are hidden in the Jewish-Palestinian population. No-one, who has not seen by himself how difficulties in getting the proper material were overcome, can fully appreciate the effort shown by Jewish workers and industrialists, who only a few years ago were considered unfit for modern industrial production. Furthermore, it might have been expected that at a time when every product was extremely scarce and bought by the public at any price, the quality of the fabricated goods would be indifferent. This was not the case in Palestine and we, the critics by profession, can say that articles of the same kind coming now from abroad are often not only not better, but less good than local products. This fact offers a bright outlook for the possi-





Machine engraving on microscopic tubes

As regards the present situation in Palestine, it would be too optimistic to say that enough has been done in the direction indicated. There have been certain modest beginnings of instrument industry, most of them aided by war needs. The technical foundation is mostly insufficient and in no case competitive with similar undertakings, even of smaller type, existing abroad. One modest trial to create such an undertaking, based on 20 years' experience at Zeiss Works, was made just before the war by the author. Thus it was possible to contribute to some extent to the war effort, the experiment having been sponsored by the British and American authorities and the Palestinian Government. It may be of interest to sum up the substance of eight years work there.

The experience in these years has shown that it is possible to find enough human material fully suitable for the work in question. The Jewish worker is capable of reaching full skill

in an astonishingly short time; he is ready to learn and willingly accepts criticism of what he is doing, if properly treated. Well selected young men succeed in work which is normally done abroad by grey bearded specialists.

The work done in the "Laboratory for Precision Work" (no better name was found for the beginning) was based on the principle that, as far as possible, instruments of new design had to be created, if a continuous development was to be achieved. Copying articles elaborated elsewhere cannot bring success, because the prototype is always ahead. Nevertheless, experience gathered abroad must be willingly accepted and digested. At the same time, the special conditions of work in Palestine, a semi-tropical country, had to be taken into account and the method imported or learned elsewhere had to be adapted. During the war it was necessary to design and build the whole machine and testing equipment with tremendous loss of money and time. It would naturally be

nonsense to continue with such work now. There is a natural danger of over-estimating one's own work while so far away from the world centres of industry and science. It is therefore absolutely necessary to send young men, trained in Palestine, abroad to learn or work in similar undertakings. An important help would be if English or American manufacturers, interested in Palestine, could give such a chance to our young generation by offering them scholarships or advanced apprenticeships. But some way should be found to prevent these young men, whose training has cost so much to Jewish Palestine, from remaining abroad when good jobs are offered to them there.

The way is long and strenuous, but much is at stake. The instrument industry is not only important and suitable for Palestine as a possibility of creating work and new markets.

It may be that still higher importance lies in the radiation of this industry to all other undertakings in the country. No plant can compete in the future without proper means of testing the product of the work. The testing methods are without exception based on some kind of instrument. Even if such instruments are bought abroad, the servicing and repair of them are dependent on the resources in the country. We are eager to maintain the high level of the Jewish medical profession. But no evolution in medicine is possible without comparable progress in the tools of the scientist. Our future depends upon the capability and knowledge of our younger generation. Let us equip our schools with Palestinian-made apparatus, and let us give to the ploughman a Palestinian-made level for terracing hills to prevent the loss of the most valuable thing we have—our soil—by inundating floods.

NOTICE.—*All machinery and instruments shown in the illustrations have been designed and produced in Palestine.*

## Printing and Publishing

The Jews have always been a highly literate people. It is therefore not surprising that the printed Hebrew word plays a prominent role in Jewish Palestine. A great number of dailies, periodicals and book publishers supply the Jewish community with reading matter. In Palestine, as in other countries, the demand for current information and books in general has grown considerably during the war; but even if it were not for the war the market for Hebrew publications would have expanded, because many of the immigrants of the years 1933-38, and especially their children, reached only in recent years the stage at which they know sufficient Hebrew to read newspapers and books. And, while at the end of the last war modern Hebrew publishing still depended to a considerable degree on a number of wealthy patrons, it may be said to-day that the Hebrew reading public is already large enough, and the habit of reading as well as buying books, has become sufficiently widespread to support a fair number of publishers (even if not quite as many as are active at present).

### The Daily Press.

At present eight Hebrew dailies appear in Palestine, of which all but one are morning papers, and the English *Palestine Post*.<sup>\*</sup> The size and the circulation of the Hebrew papers are considerably restricted by the limited supply of newsprint which is imported and distributed by the Government. On weekdays the papers appear with four pages, and the Sabbath eve issues contain six or eight pages, which is about half of the pre-war size. Most of the first page is taken up by world news. All papers print Reuter's telegrams. Some are also members of the American United Press. The telegrams are supplemented by radio news, which is taken down by news editors in practically all European languages. The news is illustrated by topical maps and pictures. The larger papers have their own correspondents in London, New York and the important centres of the Middle East,

<sup>\*</sup>Arab publications are outside the scope of this review.

who wire and mail mainly information of Jewish and Palestinian interest, in addition to the telegrams of the Jewish Telegraphic Agency and Palcor. The last page is reserved for local news gathered by reporters and sent in by local correspondents throughout the country. The inside pages are filled with editorials, articles by regular contributors, letters to the editor, various features and theatre and art criticism. On Fridays most papers devote considerable space to Hebrew and general literature and book reviews. Advertisements take up twenty-five to thirty per cent. of the total space.

It is to be regretted that until now there has been no Audit Bureau of Circulation in Palestine; circulation figures for various papers are, therefore, necessarily guesswork. All Hebrew dailies are printed in Tel-Aviv and circulate all over the country.

The oldest Hebrew daily is *Haaretz* which was established in 1918. It is not the mouthpiece of a political party or an organised group interest. *Haaretz* is owned by the Schocken family which is also active in the book publishing field. The editorial policy of *Haaretz* is independent Zionist and progressive. The paper endeavours to present general and local news fully and objectively, and it pays special attention to economic and cultural matters. *Haaretz* has readers among all strata of the Jewish population and it is read by most members of the middle and professional classes and has a wide circulation especially in the three main towns of Tel-Aviv, Jerusalem and Haifa.

*Davar* is the main Labour daily and the official organ of the General Federation of Jewish Labour (*Histadruth*), the largest organised body in the country. It champions the cause of the Jewish working class and in the political field it stands for socialist Zionism and supports the Executive of the Jewish Agency. *Davar* publishes various supplements, including a children's weekly, Labour women's monthly, and one devoted to co-operative economics. On Fridays the paper includes a literary page.

*Davar* has the largest circulation of all Hebrew papers.



*Haboker* is the mouthpiece of the right wing middle class and stresses the viewpoints of citrus growers, employers, merchants and house owners. *Haboker* also has a children's supplement. Both *Haboker* and *Davar* run small sized noon editions. *Mishmar* is the paper of the Hashomer Hatzair, a left-wing Marxist party with the *Histadruth*, and was started in 1943.

Three smaller papers are *Hatzofeh*, organ of the orthodox *Mizrahi*, *Hamashkuf*, a Revisionist newspaper, and *Hegge*, a small paper published by the *Histadruth* in vowelised Hebrew for the benefit of new immigrants. *Yedioth Aharonoth* is the only evening paper.

#### Periodicals.

Fifty odd Hebrew weeklies, monthlies and quarterlies appear in Palestine. Some of them are of a political character, such as *Haolam*, weekly journal of the World Zionist Organisation, *Hapoel Hatzair*, the organ of the Palestine Labour Party, and *Amudim*, the mouthpiece of the Aliyah Chadashah. *Hed Hamizrach* advocates the interests of the Sefardic community. The monthly *Moznayim*, a literary monthly, is published by the Hebrew Writers' Association. Other literary monthlies are *Gilyonoth* and *Gazith*, the latter taking special interest in the fine arts. *Kiryath Sefer* is a bibliographical quarterly and published by the National and University Library, and *Tarbitz* is a scholarly quarterly devoted to the humanities and published by the Hebrew University. The Historical and Ethnographical Society publishes *Zion*, a quarterly devoted to Jewish history. In 1943 the Public Information Office of the Palestine Government began to publish a Hebrew weekly called *Hagalgal* which contains popular articles on world events, technology, archaeology, etc., topical pictures and literary reading matter; some space is also devoted to the Hebrew programme of the Palestine Broadcasting Service. *Hagalgal* is part of a scheme under which weeklies are published on behalf of the Government, in the three official languages Hebrew, English and Arabic.

A number of periodicals represent the economic interests of industrialists, businessmen, farmers and employees. There are also several professional journals for doctors, lawyers, engineers and architects.

#### Book Publishing.

Important changes have taken place in the field of Hebrew book publishing in recent years. The market for Hebrew books has expanded; new publishing firms have been set up; new methods have been introduced in order to facilitate publication and to foster the distribution of books. Until a few years ago the sale of two thousand copies of a book was to be considered a real success; to-day sales of three, four and five thousand copies are no longer rare. These are quite respectable figures if one remembers that the whole Jewish population of the country is only little more than half a million, of which no small part is yet unable to read Hebrew literature. Next to the growth of the reading public, the subscription system has been responsible for this remarkable development. A number of important publishers, notably the publishing house of the *Histadruth*, publish series of books, a book a month, which are sold to regular subscribers at a rebate of about fifty per cent. This reduced price is a powerful stimulant for distribution, because in general prices of locally produced books are very high as a result of the local inflation. Wages and salaries are about three times as high as before the war. The price of paper has multiplied four-fold (controlled price) and ten-fold (black market price). Paper is in extremely short supply; paper control is inefficient and a considerable part of the limited supply finds its way to the black market. In consequence, prices of new Hebrew books are three to four times their pre-war prices, while English books, which are brought to Palestine in large numbers at controlled prices, are not much more expensive than they were before.

An interesting and important function is fulfilled by the Bialik Foundation; and similarly on a smaller scale by the Rabbi Cook Foundation. The Bialik Foundation was established in 1935 by the Jewish Agency with the object of promoting the publication of works, both original and translated, of high quality and lasting merit. Normally the Foundation does not publish books on its own, but assists a number of publishing firms by putting at their disposal carefully edited or translated manuscripts of books which it would be difficult or impossible to publish in a purely commercial manner. Thus





At a Jerusalem Bookshop



Street notices in Hebrew

Photo BLACK STAR

the publishers save considerable initial expense connected with the preparation of the manuscripts and pay the Bialik Foundation only the usual royalties on the books actually sold. In the ten years of its existence, the Bialik Foundation has assisted publication of close on two hundred books and its annual budget is at present LP14,000. The Rabbi Cook Foundation was founded by the Mizrahi and is also assisted by the Jewish Agency; it specialises in the publication of books of religious interest.

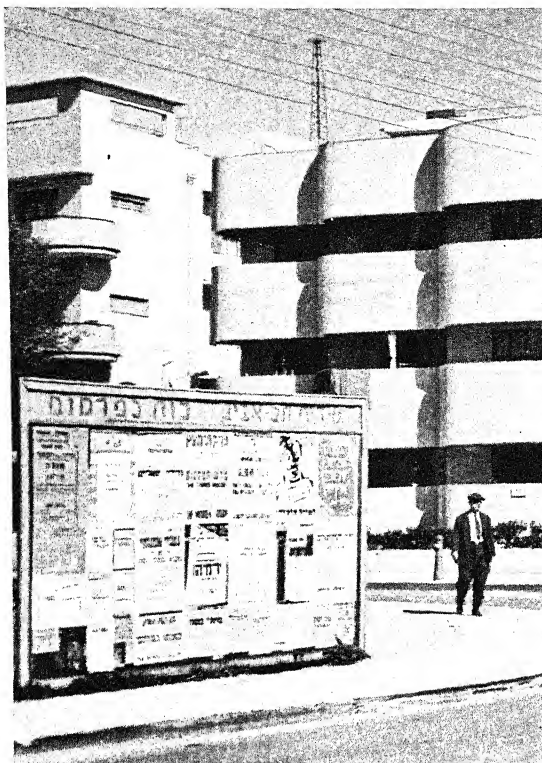
### Hebrew Books

The range of Hebrew publishing is very wide. The creation of a national literature and its dissemination among the general public in the shape of books, which in other countries took centuries of gradual development is, in the case of modern Hebrew letters, being compressed into the span of a few decades. With the exception of the Bible which, of course, is still being read in its traditional form, it is becoming increasingly necessary to publish new editions, anthologies and selections from the classical standard works of the post-Biblical, talmudic, rabbinical and medieval Hebrew literature in a manner suitable for the general reader of our days. There has been a good demand for such works, especially of Bialik and Ravnitzky in their *Sefer Ha Aggadah* (Legends from the Talmud) which has become a popular classic, and also of Agnon in his *Yamim Noraim* book (lore of the high holidays). But the main work has still to be done. Besides popular versions, many scholarly editions of classical Hebrew texts are also being published. Modern Hebrew writers, of course, provide publishers with much material. The two poets, Bialik and Tschernichowsky, who died within the last decade or so, have already become classics and their works are to be found on every Hebrew bookshelf. Contemporary writers and poets such as the novelists Agnon, Hazaz, Kabak, and a host of others, are widely read and their annual output is considerable. In addition to belles lettres, many scholarly and popular books are published on subjects of Jewish history, Jewish and general philosophy, politics, sociology, economics, geography, geology and mineralogy of Palestine, education, psychology and technology. Many of the authors of these books are on the staffs of the



Photo HIMMELREICH

A newspaper stall



Posters

Photo GIDAL

Hebrew University, the teachers' seminaries and the Haifa Technical School.

Another very large and important field are textbooks for the Jewish network of elementary and secondary schools. A number of publishers specialise in books for children and juveniles. In recent years many documentary books have appeared with accounts of the terrible experiences of Jewish refugees who succeeded in escaping to Palestine from occupied Europe.

A large proportion of the time and energy of Hebrew writers and publishers is devoted to the publication of translations. Modern Jewish culture would be almost unthinkable without Hebrew renderings of the significant works of world literature, humanities and science. The translation of some of these works presents difficulties, but it is also of special importance because it compels translators to coin or adapt Hebrew words for things and concepts unknown to the classical Hebrew vocabulary. Modern

Hebrew is, therefore, enriched by translations in a manner somewhat similar to that in which several European languages originally became literary mediums through the translation of the Bible. Further, a steady flow of current literature and books of topical interest are presented in Hebrew translations.

Some of the books which appeared in Hebrew during the war years may illustrate the scope of translation and the variety of interests among Hebrew readers. Among classics: Homer's *Odyssey*, Plato's *State*, Seneca's *Moral Letters*, Dante's *Inferno*, Shakespeare's *Hamlet* and *Midsummer Night's Dream*, new translations of *Robinson Crusoe* and *Gulliver's Travels*, selections from Rousseau's *Emile*, an anthology of English verse, an anthology of Russian verse, Goethe's *Faust*, Heine's *Romantic School*, Macaulay's *Historical Essays*, works by Mark Twain, Tolstoy, Tchechov, Gorky; translations of modern writers include Churchill's *My Early Life*, *History of Europe* by H. A. L. Fisher; books by Somerset Maugham, J. B. Priestley, Ernest Hemingway, John Steinbeck, Frederick Prokosch, Robert Greenwood, and many others. In the topical variety, translations include books by John Gunther, Eve Curie, Ilya Ehrenburg, Vansittart, Rauschnigg, Quentin Reynolds, Wendell Willkie and others. The bibliography of the Jewish National and University Library registered 855 titles in the year 1943-44. Even if we deduct from this figure small pamphlets and reprints, there remain over 500 new Hebrew books which appeared within one year. The books were produced by 20 odd publishers, of whom the following are the most important: *Am Oved*, founded in 1942 by the Labour Federation (*Histadruth*), is to-day the largest publishing house in Palestine. Every month *Am Oved* publishes several books covering every field of modern Hebrew and current literature, fiction, poetry, general knowledge, politics, the Jewish Labour movement, and juvenile literature. Most of its books are sold to regular subscribers. *Dvir* is one of the oldest firms. Founded by Bialik and Shmarya Levin, it has published many old and modern Hebrew classics. Its authors include Mendeley Mocher Sefarim, Schalom Aleichem, Perez, Bialik, Shalom Ash. It publishes dictionaries and standard works





Photo GIDAL

Posters in Tel Aviv

such as Professor Dubnov's *World History of the Jewish People*, Lachover's *History of Modern Hebrew Literature* and works by Prof. J. Klausner. *Massadah* is a very active all-round publishing firm producing original and translated fiction, popular encyclopaedias and school books. *Sifriath Poalim* and *Hakibbutz Hameuhad* are publishing ventures by two organizations of collective settlements. They specialise in socialist literature of the Marxist variety and also publish modern Hebrew literature as well as translations and books on educational, agricultural and scientific subjects. *Omanuth* has been a pioneer in the field of children's and juvenile literature as well as text books for schools. *Schocken* publishes the works of Tschernichowsky, Agnon and other modern Hebrew writers, scholarly editions of medieval Hebrew poetry and translations of classical and modern literature.

Until recently but few Hebrew publishers paid much attention to the outward appearance of the books they produced. Books were printed indifferently in unwieldy sizes and bound in forbiddingly dark calicoes. In recent years, in spite of the shortage of materials caused by the war, much has changed for the better. Book sizes have become smaller and handier, pains are taken in order to secure satisfactory typographical arrangements of the pages, and, though the books can be bound only in half cloth, they are wrapped in colourful jackets many of which are of a high artistic standard and can stand comparison with books imported from England and America.

### The Printing Trade.

There are three to four scores of printing presses in Palestine which are owned and run by Jews. The greater part of these presses are small shops employing five to ten workers, often only members of the printer's family. There are about ten larger presses with twenty-five to forty workers each. No exact figures are available, but it seems that altogether there are between six and seven hundred Jewish workers in the printing trade. Most of them are organised within the framework of the Histadruth. Some of the larger presses are Co-operatives owned by the workers.

After six years of war in which practically no replacements could be made, the mechanical and typographical equipment of the printing presses is sadly worn. Before the war most of the flat bed presses and hand types were imported from Germany and Poland, and the transition to English and American makes will not be too easy, for the continental type height is different from the Anglo-Saxon one. Only composing machines and newspaper presses were already imported from England and America before the war.

All the newspapers and periodicals and most of the current Hebrew books are composed on Linotype and Intertype machines. Only vowelised Hebrew (which cannot be composed on slug casting machines), job work and certain types of religious and scholarly books in Jerusalem are set by hand. One of the tasks awaiting Jewish printers in Palestine is the



creation of new Hebrew type faces. With the exception of one or two alphabets suitable only for advertisements and publicity work, the renaissance of the Hebrew language has so far produced no new type faces. Most of the types used at present are ugly and corrupt descendants of the beautiful Hebrew types originally cut in Italy in the sixteenth century. Some capable artists in Palestine are seriously working on new types; but until now none has reached the stage of cutting and casting. Before this question has found a satisfactory solution, modern Hebrew printing will not achieve the dignity which it deserves.

Because of the increased activities of Hebrew publishers, the printing presses have been very busy during the last few years. Considerable orders have also been placed by the Military Authorities. Much of this work was in Polish.

Important regular customers of the Jewish printing trade are the institutions of the Zionist movement, such as the Keren Hayesod and the Keren Kayemeth which print in Palestine most of their propaganda material distributed in many languages all over the world. These orders were very much restricted by the war and the paper shortage, but they will undoubtedly assume large proportions in the future. This kind of work calls for a high standard of workmanship and taste. It is astonishing what good results are sometimes obtained even to-day on worn-out presses and in spite of inferior kinds of ink and paper, thanks to capable photographers, designers, lay-out artists and devoted workers. Nevertheless, printers in Palestine will have to re-equip their plants thoroughly in the near future so as to do justice to their important work.

## Insurance Companies

Insurance serves a threefold purpose within a country's economy.

1. It protects the individual from the sometimes disastrous results of a loss suffered by himself or his household, caused by external events normally beyond his control. The indemnity paid by an insurance company to the insured individual enables him to resume his economic activities, thus regaining for the country an economic asset in place of a possible social liability.

2. In the case of life insurance it is either the family of the deceased breadwinner which is protected, or the insured himself in his old age. This aspect of life insurance is in itself of the utmost importance to the community and to the economy of the country. But beyond this, life insurance in its various forms fulfils another highly important economic purpose. The steadily growing life-funds of a life insurance company or institution, which are in fact but the accumulated savings of the insured persons, must find their way back into the country's economy in the form of various investments, old and new. It is certainly no exaggeration to say that in countries with a large insurance tradition the main task of recapitalization falls on the insurance companies with their enormous accumulated funds.

3. Insurance is an important "industry." In a country like Great Britain it employs great armies of men and women. It produces "goods" for internal consumption and for export provided the necessary resources are available, i.e. skill, experience, world-wide contacts and connections, and a high standard of esteem as regards security and confidence.

The importance of the insurance industry for Palestine's economy—bearing in mind primarily the Jewish sector—is evident. The Jewish sector represents a rapidly developing economic unit conducted on modern lines and comprising a variety of branches driven forward by strenuous activity and enterprise. This rapid development does not allow for an inner accumulation of funds in any one of the individual enterprises on a scale which in itself could be sufficient to

meet arising emergencies. There is therefore more need than may be the case in a long and firmly established economy for the provision of insurance against every possible risk.

### Insurance and Investments.

It goes without saying that the young Palestine economy, with the dynamic forces inherent in its structure and in the people behind it, is in constant need of new capital investments. Every new source of funds capable of being converted into long-term investments is therefore a vital necessity and the first condition for further development. Life insurance with its rapidly growing funds might easily fulfil this task.

Finally, as a branch of economic activity employing in its development an ever increasing number of working men and women, the insurance industry in Palestine might make an additional contribution to the country's work and welfare. Palestine is at present a country which buys a great part of its insurance needs from abroad. This insurance buying is equivalent to an invisible import and increases the adverse trade balance of the country. The Palestinian insurance industry may make up for this deficiency and even become—after a very long and strenuous period, of course—a seller and exporter of insurance to the neighbouring countries.

There are in existence in Palestine to-day practically all the necessary conditions for the development of a successful insurance industry. The public—so far as the Jewish community is concerned—is becoming more and more insurance-minded. It is one of Palestine's paradoxes that the Jews, who are known all over the world as an insurance-minded people, have failed to prove this rule in Palestine. A long period of education and propaganda was required to make the Palestine public forget the disastrous experiences which many had had with insurance companies all over the European continent. Local Palestinian insurance companies have contributed much to a change of mood in this respect. They have tried their best, and certainly

have been successful, in strengthening the shattered confidence of the public in insurance in general and in the local companies in particular.

As far as the Arab public is concerned, their insurance-mindedness is still in the infancy stages. The bulk of the Arab population would probably never become a party to an insurance contract. Owing to their religion and to an acquired fatalistic outlook, they regard a calamity or accident as part of their fate and provisions made to meet the consequences as of no avail. Arab economy, however, is in many respects undergoing deep changes. The once primitive and feudal social and economic structure is giving place to a modern economy with steadily increasing industrialization. There is no doubt that that part of the Arab public most affected by this modern development is being driven, to a growing extent, towards the desirability of insuring against the manifold and numerous emergencies endangering their lives and economic position.

#### British Government Attitude.

There is another factor in the country contributing to an increasing demand for insurance, namely the British Administration. To be exact, the British Administration has done nothing whatever during the 25 years of the mandate to promote the interests of insurance in Palestine. Nothing has been done to protect even the interests of the insured public either by control or supervision of the existing insurance companies—local or foreign—or by introducing modern legislation in respect of insurance transactions. The only demand put to the sixty to seventy companies operating in Palestine has been the demand for a more or less token deposit with the Treasury of LP1,000 for every class of business transacted by an insurance company in Palestine. This deposit is certainly not sufficient to protect the insured and not an adequate means of preventing the growth of mushroom companies!

Modern development of the country's economy and persistent demands for the protection of the rights of the working classes had led to the introduction of the Workmen's Compensation Act during the early days of the Administration.

The necessity to improve on this Act—in its first stages rather primitive—and to bring it up-to-date with the rising standard of life caused a steeply increased liability on the part of the employers and, as a result, an increased demand for Workmen's Compensation Insurance. The newly created Act brings the Workmen's Compensation Act in line with the practice prevailing in the United Kingdom.

The Administration has published (but not yet enacted) a new Civil Wrongs Ordinance, which is badly needed in Palestine, where Turkish Law is still governing in this matter. As a corollary, the introduction of a compulsory Motor (Third Part) Insurance is contemplated and will probably be enacted in the near future. Thus, limping behind the modern European demands of the country, the Administration is compelled to pay more attention to insurance problems.

The conditions for the creation of an insurance industry in enterprise and professional ability exist in the country in great abundance. The Jews played an important role in insurance in Europe, especially in the Central and South-European countries, both as organizers and in executive positions. A great part of this valuable human material is already in Palestine, and many more are waiting to go there at the earliest opportunity. An essential condition, however, for an insurance company to be successful is for it to command the full confidence of the insured public. Such confidence cannot be won except by long-lasting experience by both parties—on the part of the insurance company this experience must be based on a thorough knowledge of prevailing conditions and of the needs of the public; on the part of the public it consists in the knowledge that the insurance company understands its job and that it is capable of meeting any claim which arises.

To gain this confidence of the public has been one of the foremost tasks of the local or national insurance companies. It has certainly not been an easy task. We have to remember that before the war there were some 70 foreign companies operating in Palestine and a score of Lloyds' Agencies and Brokers. In addition, there were six or seven national companies in the first stages of their activities. Long before the outbreak of the war, first the German and

then the Austrian companies were compelled to withdraw from the market, and Italian and French companies followed as the war drew on. Out of seven national companies only four continued to operate, some of them hampered by the necessity of internal reorganization.

It may be said that the national companies emerged from this test with flying colours. They can point to a steady and healthy development. Their part in Palestine's economic life is increasing both in absolute, and in relative, figures. They have succeeded in gaining the confidence not only of the Palestine public but also of foreign, and especially British, insurance interests.

#### Jewish Insurance Companies.

Palestine has to-day four local Jewish insurance companies, some of them founded only a few years ago, none longer than 20 years ago. They are *Hassneh*, *Judea*, *Migdal* and *Zion*. A new company *Habinyan* and an Arab insurance company *Arabia* have taken up activities.

The four above-mentioned companies are mixed offices. Their combined Life-Portfolio amounted, at the end of 1944, to some LP6,000,000 sum insured (which represents some 40 per cent. of the entire Life business, if the portfolio of British and Dominion companies is added). Their combined total income from premiums other than life insurance approaches the £400,000 mark. In the absence of any official insurance statistics it is difficult to estimate what percentage of the total premiums of general and marine insurance this figure represents, but it is generally assumed to be something between 25 and 30 per cent.

The total combined premium income of the local companies from Life and other business for

1945 is estimated at LP900,000 to LP1,000,000, out of which approximately 45 per cent. belongs to *Hassneh*, the largest local company owned by the General Federation of Jewish Labour.

It is difficult to estimate how far Palestine's adverse trade balance is affected by the fact that at least part of the premiums collected by foreign companies does not remain in the country. The estimates vary between LP400,000 and LP750,000 a year.

It would be wrong if we were led to conclude from the above that it would be in the interest of Palestine economy to become 'self-sufficient' or 'self-contained' in the field of insurance. This is far from being correct. There is no branch of economy as 'international' as insurance. The very essence of Insurance is that it is international, and its only chance of success lies in the world-wide spreading of risks and in its world-wide connections. This should not, however, preclude the possibility of Palestine becoming a future centre of insurance activities in the Middle East. We are now witnessing enormous economic developments in that part of the world. The modern development of economic methods (which, incidentally, involve insurance, too) will gradually transform the whole of the Middle East with its vast resources into a progressive economic entity. It is to be expected that Jewish enterprise and the determination to rebuild Palestine will be an important factor in this process. The accumulated capacity and experience in the field of insurance, combined with world-wide connections and a well-established reputation, will enable the Palestine insurance industry to play its part in the future development of that part of the world.

## Tourism and Health Resorts

Palestine seems destined by nature and history to play a prominent role as a health and tourist centre. From the coastal plain, with its Riviera climate, it is only a distance of forty to sixty miles to the mountains of Judea and Galilee, where cold is intense even in the height of summer. Another twenty to forty miles away, and subtropical vegetation of the Jordan valley, the lake of Galilee and the Dead Sea will make you believe in winter time that you are near to the Garden of Eden.

Yet for centuries these advantages have not been exploited, and few of the numerous visitors to the Holy Land have realized that this country could be an ideal place for recreation of body and mind. The Holy Land had long been a country for pilgrimage. To walk in the footsteps of Abraham, Moses and Jesus and to see the remnants of the famous temples of Solomon and Herod, was the dream of many generations of mankind. But it has only recently come to attract holiday-makers.

The treasures of nature had been neglected under the misrule of the Turks and the supineness of the country's inhabitants up to the time of the British Mandate and Jewish immigration. Until that time the Christian churches were the only bodies interested in the development of the tourist trade. Their activities were naturally limited to the places sacred to Christianity. It is noteworthy that the Moslem world has so far abstained from participating in this development. Thousands of wealthy Egyptians, Syrians and Iraqi Moslems have been attracted by European capitals, spas, the Alps and the Riviera, while very few have taken an interest in visiting Jerusalem—one of the holy places of Islam.

The Christian churches were keen on preserving the tradition of pilgrimage to the Holy Land. They help to create an atmosphere of sanctity peculiar to the country. Nazareth, for instance, still retains something of the period of the Crusaders. Beautiful women clad in costumes embroidered in the style of the twelfth century pose gracefully with earthen jars on their heads. Franciscan monks walk piously through

old gardens to chapels and churches. Spacious hospices with their refectories impress the visitor; and in the few days of his visit he is under the impression that he lives a life linked with religious mystery.

Modern Jewish Palestine has never tried to get a foothold in these places built and developed by others. Outstanding features of the development of the tourist trade in recent years by Jewish immigration are seaside resorts starting from Tel Aviv up to Naharia, the hot springs of Tiberias, the creation of a tourist centre in Kallia on the shore of the Dead Sea and on the Carmel, and the building of sanatoria and recreation centres in various settlements.

All these developments, contrary to similar developments in other countries, were started without any help from the Government. Even in the Holy City itself, Palestine's finest hotel, the King David, and some other first class hotels, have been built with Jewish capital. These new hotels have paved the way towards making Jerusalem a tourist metropolis.

It is remarkable that in one field, in which Jews are supposed to excel, Jewish Palestine has failed. We refer to publicity and propaganda of the newly built health resorts and spas. There are hardly any posters, pamphlets or advertisements to direct tourists to these new resorts; and even the modern Jewish town of Tel Aviv, which can boast one of the best beaches in the Middle East, has so far not published one poster to appeal to tourists.

Few of the tourists visiting Palestine will have travelled across a moonlit sea of Galilee in one of the modern motor launches to picturesque Ein Geb, or visited the parks of the Hot Springs of Tiberias. And still fewer are they who know that amidst the Hills of Judea and Galilee comfortable hotels and sanatoria of Jewish Settlements offer hospitality to the visitor amidst magnificent scenery.

Future developments may be briefly indicated. Palestine's tourist trade has seven centres which are steadily expanding. Jerusalem and its environments, including Bethlehem, Ramallah Kiryat Anavim, Motza and Ein Karim; Tel



Aviv and the coast up to Nathania, including the garden city of Ramath Gan and Herzlia; the Carmel mountains and its slopes up to Zikhron Yaaqov; Galilee from Tiberias to the Waterfalls of Metullah, the coast between Acre and Naharia; the neighbourhood of Nazareth and the Dead Sea area around Kallia and Jericho.

The biggest developments may be foreseen in Galilee and in the coastal plain. The Lake of Galilee is undoubtedly one of the world's most beautiful lakes. A settled programme for expanding tourist centres in the neighbourhood is far advanced. According to these plans a modern spa will be built outside the old city of Tiberias near to the Hot Springs which will be linked with a second health resort on the hills of Poriya. Some twenty miles in the mountains near the old town of Safed, medieval centre of Jewish mysticism, a start has been made in creating a summer resort on Mount Canaan (3,000 feet), by the building of a modern hotel. From here up to the Syrian border a number of rest houses and sanatoria are being planned in various finely situated settlements. Some of these buildings are already well on the way.

Some thirty miles to the north-west, in Naharia, the latest addition to Palestine's modern sea resorts, which can already accommodate about eight hundred guests, the building of two big hotels is to commence soon; in Shave Zion near Naharia fresh developments may also be expected.

Mount Carmel tourist trade has been severely hit by the occupation of its biggest hotels by military authorities; but many amenities have been added in war time for the guests expected as soon as these hotels are again at the disposal of the general public.

Tel Aviv has naturally the most considerable scheme with a view to attracting tourists. Swimming pools, a big sports centre, new facilities on the beautiful beach and more hotels are only part of this scheme. This gay town of Palestine's art and music should hold its own in the tourist field, as it has already become popular with many soldiers and officers serving in the Middle East.

The planned road along the beach from Tel Aviv to Nathania will lead to the establishment of a chain of sea resorts between these two

cities. Round Jerusalem various health and recreation centres were built during the war. The villages of Kiryat, Anavim and Maale Hahamisha, surrounded by woods, are special examples; near Jerusalem, in the garden suburbs of Beth Hakerem. Montefiore and Talpioth, quiet hotels and boarding-houses are available for those in need of rest.

Palestine's most fashionable health resort, Kallia on the Dead Sea, will be considerably enlarged as soon as building restrictions are lifted and the necessary materials are available. Good transport is essential to tourism, and the Jewish Bus Companies already provide the best communication system available for tourist traffic in the Middle East. In conjunction with them, "TOUR", Palestine Tourist Development Company Limited, as well as other companies are planning cheap tourist travel along the lines of "Tour Holiday Trips".

Much will naturally depend on communications with the neighbouring countries and overseas; and the Palestine Railways are planning to connect Palestine with other countries of the Middle East by air-conditioned express trains. Post-war air travel is bound to bring Palestine closer to the main centres of the Western world.

Before the war about 35,000 tourists visited Palestine every year. On an average tourists stayed three days in the country and spent about LP10 per head. This figure naturally does not include investments or donations to the various national and charitable institutions. Out of the total number of 35,000, about half came from Eastern and Central Europe, the other half from America, Western Europe and the British Empire. The loss to Palestine tourism which will result from the destruction in Europe, will, one may presume, be made good by an increase of tourist traffic from America and the British Empire. Thousands of allied soldiers may well be propagandists for Palestine in their homelands. Thousands of Jewish families which left Europe have been split between Palestine, America and the Empire, and many will surely wish to visit their relatives in Palestine. In the post-war period the Holy Land will once again attract pilgrims from the four corners of the earth.

It may be assumed that there will be a general

increase of visitors and that tourists will also increase their average stay in the country. This will be possible if the developments put in hand continue and if scheduled publicity attracts not only sightseeing tourists but residential holiday makers. It may be roughly estimated that the average stay of tourists will in the future be prolonged up to ten days, and that the amount spent by them will increase to about LP30 per head. This would bring the income of Palestine from the overseas tourist trade to a total of about one million pounds per annum. This amount will be increased by traffic from the Middle East and by the inner tourist traffic. It is not within the scope of this article to deal in detail with these subjects but to give a general view of the prospect. It can be assumed that approximately five per cent. of Palestine's Jewish population will spend an average of ten days' holiday inside the country. The average amount spent in peacetime, including travel, excursions, etc., will amount to about LP9 per head. Thus a total of about LP270,000 could be forthcoming from the Jewish population alone. Another LP100,000 might be spent by other inhabitants. The traffic from the Middle Eastern countries has considerably increased in recent years. We estimate this traffic in future at about five thousand per annum without taking into account transit passengers. Such visitors usually stay in the country much longer than tourists from overseas. A large number come to Palestine for their health, and it may be computed that, on an average, these tourists will spend about LP40 per head, or a total of LP200,000.

The total income of Palestine's tourist trade could, therefore, reach about LP1,600,000. Expenses for wages paid by the tourist trade might be equal to about forty per cent. of the total income. Of the remaining sixty per cent. about half might be considered as indirectly spent on wages, such as agricultural labour, providing food, etc. Altogether a probable expenditure of one million pounds on wages in the tourist trade may be envisaged. As the income of wage-earners before the war amounted to about LP180 per annum, about five thousand five hundred wage-earners can be considered as likely to be directly or indirectly employed by the tourist trade under peace-time conditions.

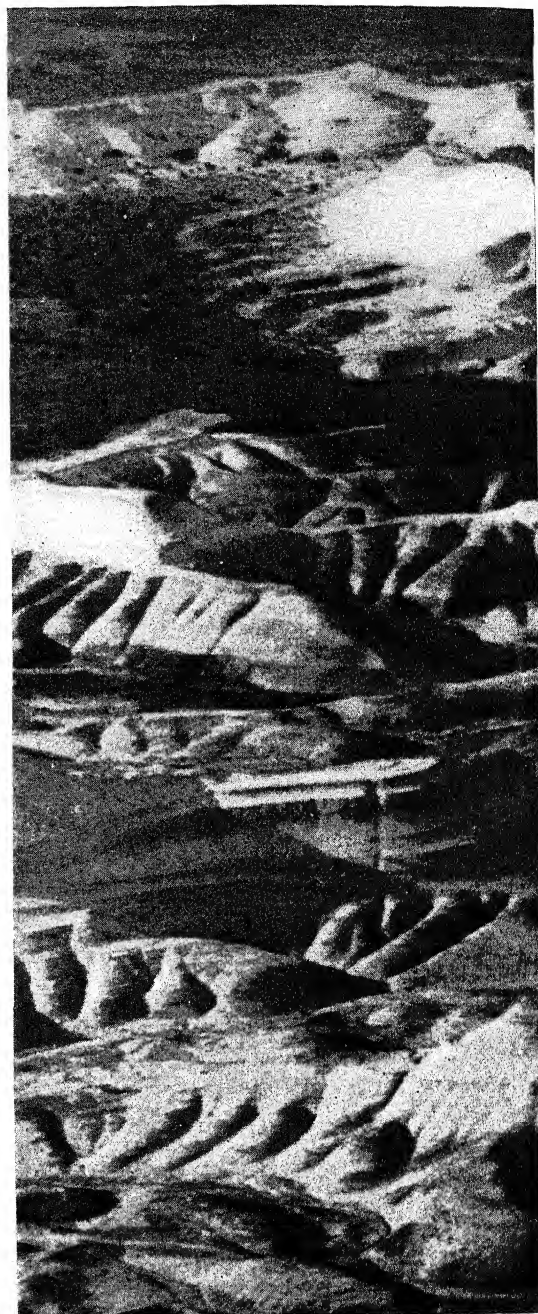


Photo BLACK STAR

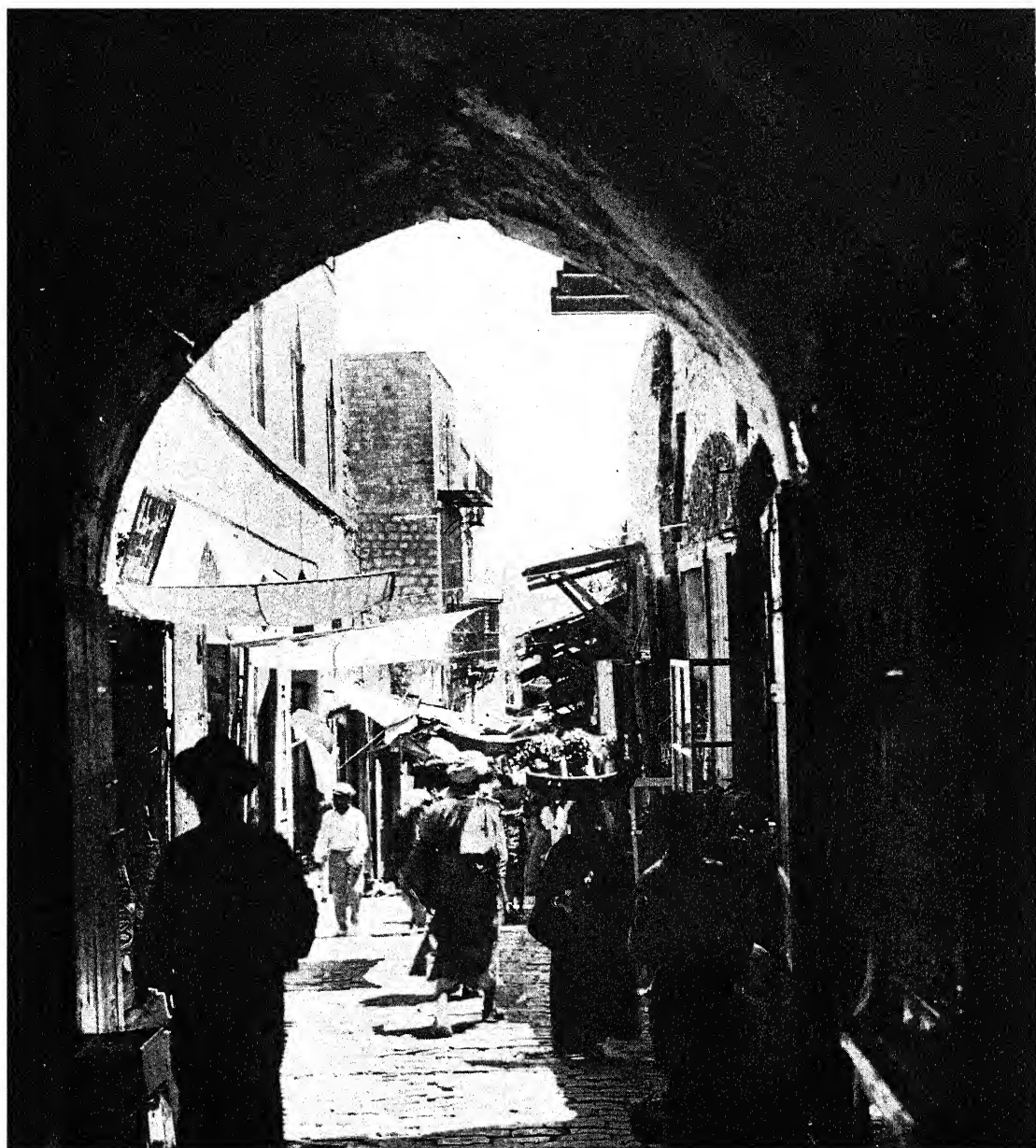
These figures illustrate the importance of the tourist trade for Palestine's economy in the post-war period. Its main asset, however, would be the invisible export it provides.



Rugged 'landscape' of the Dead Sea

The possibilities of increasing Palestine's income from this source are naturally far greater than here envisaged. Their expansion must depend largely on three factors: co-operation between

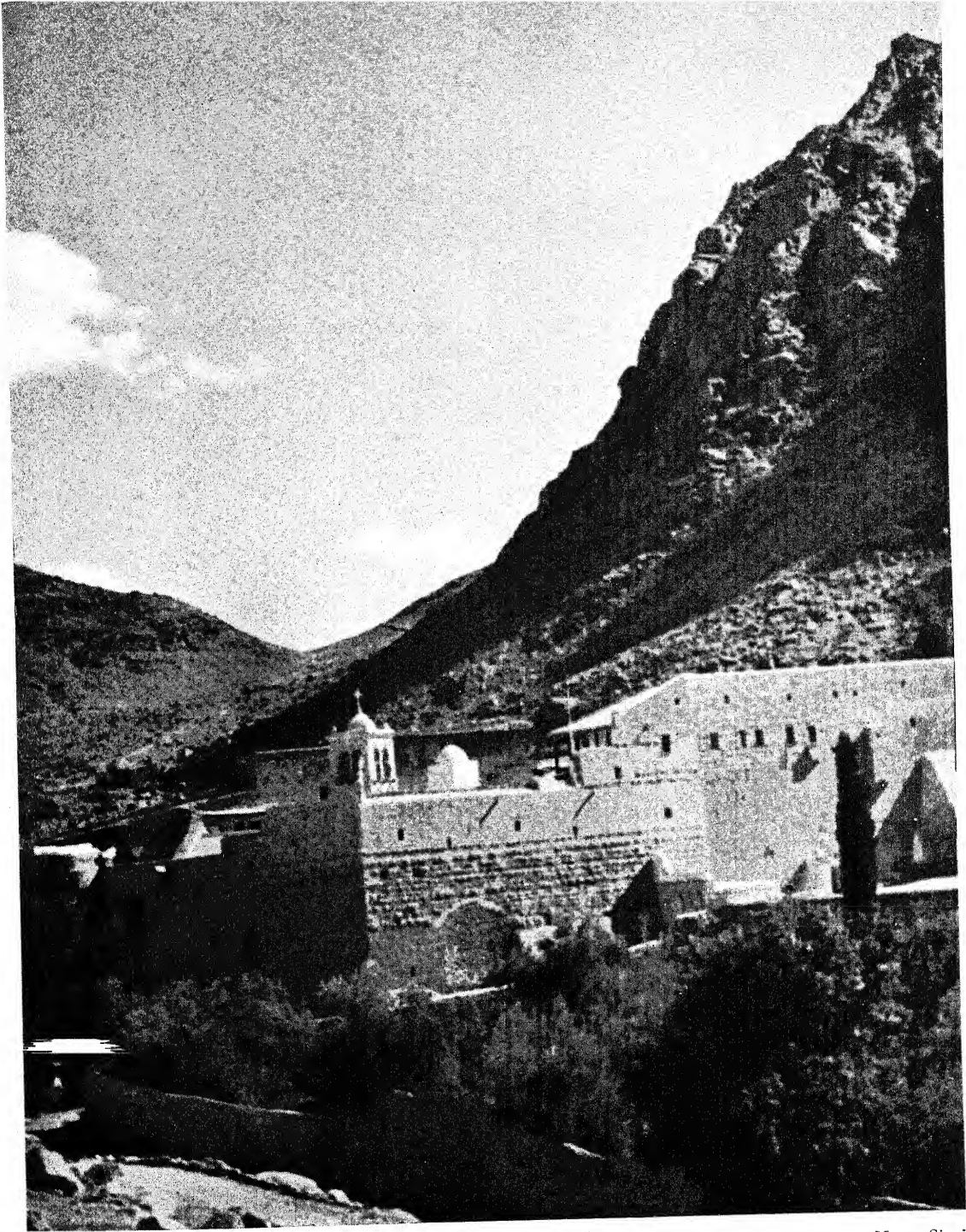
all communities in the country; the active help of Government; and the readiness of Jewish private and national capital to invest large additional amounts in tourist enterprise.



In Old Jerusalem

*Photo MALARSK*





*Photo* BLACK STAR

St. Catherine's Monastery, Mount Sinai



## The Role of Palestine in Civil Aviation

### Historical Background.

The colour and significance of Palestine's story owed much to its position athwart the main trade and travel routes and the axes of military conquest. The passing of the centuries has increased rather than decreased the commercial and strategic significance of this half-way house between East and West. The chief traders and voyagers of antiquity and the great conquerors of old alike were compelled by the geography of their world to bring Palestine into all their calculations; in turn Palestine's destiny was largely conditioned by their comings and goings. Tyre and Sidon and the Phœnicians carried on a lively trade with and through Palestine, then as now the natural junction for traffic between Asia, Africa and Europe; and across its plains strode in succession the armies of Thothmes, Rameses, Sennacherib, Cambyses, Alexander, Pompey and Titus. In later times Saladin, Napoleon and Allenby followed in their wake. Thus the history of Palestine, so closely woven with the history of the world, has been in great part a reflection of its location between three continents, between the valleys of the Euphrates and the Nile, and between the desert and the sea. Chariot and trireme have gone, yet modern transportation developments have not diminished the importance of Palestine in commerce and strategy. The coming of the aeroplane has underlined Lord Milner's pregnant prophecy that Palestine is destined to become the Clapham Junction of the British Empire. Flanking the Suez Canal, it has an obvious part to play in Imperial strategy, which can only increase in value as other "strong points" in the Middle East become less available. Its role in civil aviation is clear and was already in process of fulfilment before the outbreak of war suspended such developments in 1939. It is the purpose of this brief survey to review the prospective development of this role, and to analyse the various factors on which it depends.

Main air routes to or through Palestine.

*Pre-War:* The natural development of civil

aviation up to 1939 had produced an intersection in Palestine of four air routes. These were:

*British:* London-India-Australia, the longest air-line in the world operated by British Overseas Airways twice weekly with flying-boats landing on Lake Tiberias.

*Dutch:* Amsterdam-Netherlands East Indies, operated by K.L.M. twice weekly with landings at Lydda.

*Italian:* Brindisi-Rhodes-Palestine, operated by Ala Littoria thrice weekly with landings at Haifa.

*Polish:* Warsaw-Bucharest-Salonica-Rhodes-Palestine, operated by L.O.T. once weekly with landings at Lydda.

Palestine was not a stopping-place for the England-South Africa route, or for U.S.A. or French lines.

*Post-War:* B.O.A.C. now operates its England-India-Australia and Far East trunk route using the Dead Sea for flying-boat landings, and Lydda for the Lancastrians. The American programme has not yet crystallised; we shall consider its possibilities for Palestine later.

Dutch and Polish Air lines may be expected to recommence operations at later dates. The Italian service may not reappear. The considerations which before the war rendered it advantageous for services radiating from these countries to use Palestinian airfields will, however, still apply by whomsoever such services are operated. New and weighty considerations conducive to making Palestine an air-route junction for traffic between West and East have arisen or are developing.

### Local lines.

*Pre-War:* There are two regular lines connecting Palestine with neighbouring countries, viz:

*Egyptian:* A daily service from Haifa to Cairo and Alexandria via Port Said, and a bi-weekly service between Haifa and Baghdad, operated by Misr Air Lines.

*Jewish:* Palestine Airways operated the line Tel Aviv-Beyrouth via Haifa. Internally, the Aviron Company ran a Tel Aviv-Tiberias service.

*Post-War:* Misr Air Lines have resumed their Egypt-Haifa service on a thrice-weekly basis, and Aviron have recommenced operations with a Tel Aviv-Haifa service.

#### Factors Affecting Civil Aviation.

Geography is a powerful and permanent factor, but there are others likely to attract air traffic to Palestinian bases and generate a significant volume of passengers, freight, and mail air-traffic from and to Palestine. These factors are chiefly economic, and their effect on the three main classes of air-traffic will now be reviewed.

#### Air Passengers.

Passenger traffic by any means of transportation is a function of the general level of development in the countries affected; development of education and of standards of living prompts the habit of travel, while the development of industry produces compelling needs for travel. This is particularly true of air-travel, and in these essential aspects Palestine is pre-eminent among the lands of the Middle East.

#### Air-mindedness in Palestine.

The high level of education in Palestine has rendered its people peculiarly receptive to aviation. The comparative standard of education can be gauged from the secondary school figures; enrolments in 1939 for Palestine were 1 in 8 persons, for Egypt 1 in 538. On this fertile mental ground good seed has been sown in Palestine by such organisations as Aviation Enterprises Ltd. and the Aviron (Hebrew for "Aeroplane") Company. The former has done much to popularise flying, especially among the Jewish youth, by fostering gliding; some excellent gliding performances have been put up, and at the gliding school in the Vale of Esdrælon children are taught the construction and use of gliders. Aviron runs a flying school at Lydda. In 1944 there were in Palestine 54 Jewish holders of 'A' Licences for private (as distinct from commercial) flying, apart from Jewish pilots serving in the R.A.F. All Jewish elementary schools include model aircraft construction in their curricula.

Thus air-mindedness, the first requisite for producing an air-travelling public, is already well-developed in Palestine, more particularly among the Jewish inhabitants.

#### Development of Palestine Economy.

The rapid and continuous growth of Palestinian industries, with the attendant improvements in standards of living, bespeak a vigorous forward-looking community, having many active links with the outside world; such a community by its multifarious interests should not only attract but generate air passenger traffic. Of available statistics there is only space to quote two sets of suggestive figures:

(i) The growth of industry is illustrated by the increase in the consumption of electricity in Palestine:

1926 1,427,000 KW.

1939 24,500,000 KW.

1940 35,000,000 KW.

(ii) The standard of living and the habits of the public may be gauged from the comparative numbers of automobiles in M.E. countries:

Arabia 2,210 persons per automobile.

Iraq 619 persons per automobile.

Egypt 471 persons per automobile.

Syria 277 persons per automobile.

Palestine 102 persons per automobile.

There is the same tale to tell in the mechanisation of farming. In 1939 there was 1 tractor per 1,300 hectares for the whole of Palestine, with 1 per 120 hectares in Jewish labour settlements—a far higher ratio than anywhere else in the Middle East.

Sufficient, however, has been said here to indicate the creative activity of the country, which, if maintained, must induce a steady demand for air travel to Palestine and generate an urge among Palestinians to fly on their lawful occasions to and from other countries.

A fair index to the potentialities of Palestine itself as a source of air passengers is given by the pre-war totals of outward travel by surface transportation:

1935 67,678

1936 69,678

1937 112,332

1938 11,263

1939 69,990 persons.

It can be expected that as both the total traffic and the air-line facilities increase, an increasing proportion of all travellers to and from Palestine will go by air. The resulting volume of traffic cannot be accurately predicted, but it is bound to dwarf the 1939 totals, which furnish an interesting record of the state of affairs then:

Airport	Number of Aircraft calling	No. of Passengers landing
Haifa (airfield)	28 (landplanes)	47
Haifa (seadrome)	1,813 (flying-boats)	3,120
Lydda (airfield)	1,762 (landplanes)	2,052
Tiberias (lake)	320 (flying-boats)	21
Tel Aviv (airfield)	699 (landplanes)	(included in Lydda or Haifa figures)
Total	4,622 Aircraft	5,240

*Tourists:* Palestine's historic associations and its interest to three of the great world-religions render it a magnet to visitors from all over the globe. The stream of tourist traffic (by all means of transportation) rivals and sometimes surpasses that for Egypt:

	Palestine	Egypt
1935	106,823	93,670
1937	99,268 (including 9,800 from UK and Empire)	107,402 (including 14,411 from UK and Empire)

Visitors to Egypt traditionally include a high proportion of wealthy travellers, attracted by the amenities and the climatic advantages which Egypt offers. A fair number will doubtless avail themselves of the speed of air connections to visit Palestine. Apart from such traffic on local lines, the saving of time on trunk routes will enable a growing number of people in England, America and Europe to make visits to Palestine which the extra time required by surface transport forbids. An essential facility which must be provided is hotel accommodation. Palestinian enterprise should meet the need and provide adequate additions to the considerable number of good modern hotels already existing,

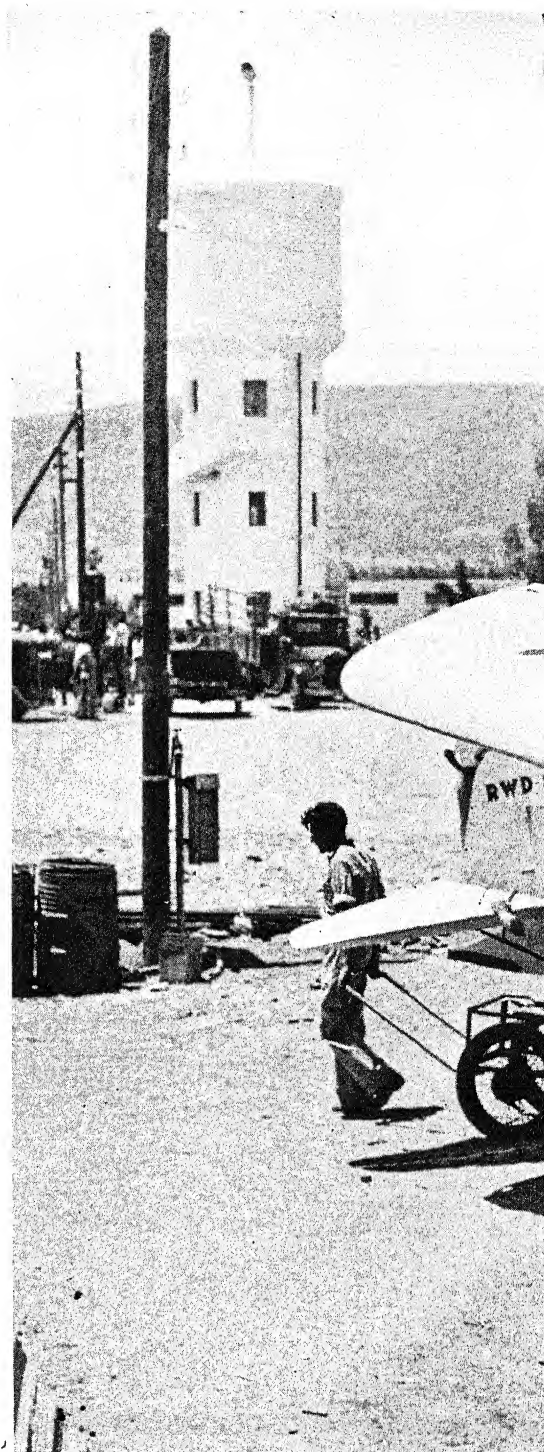
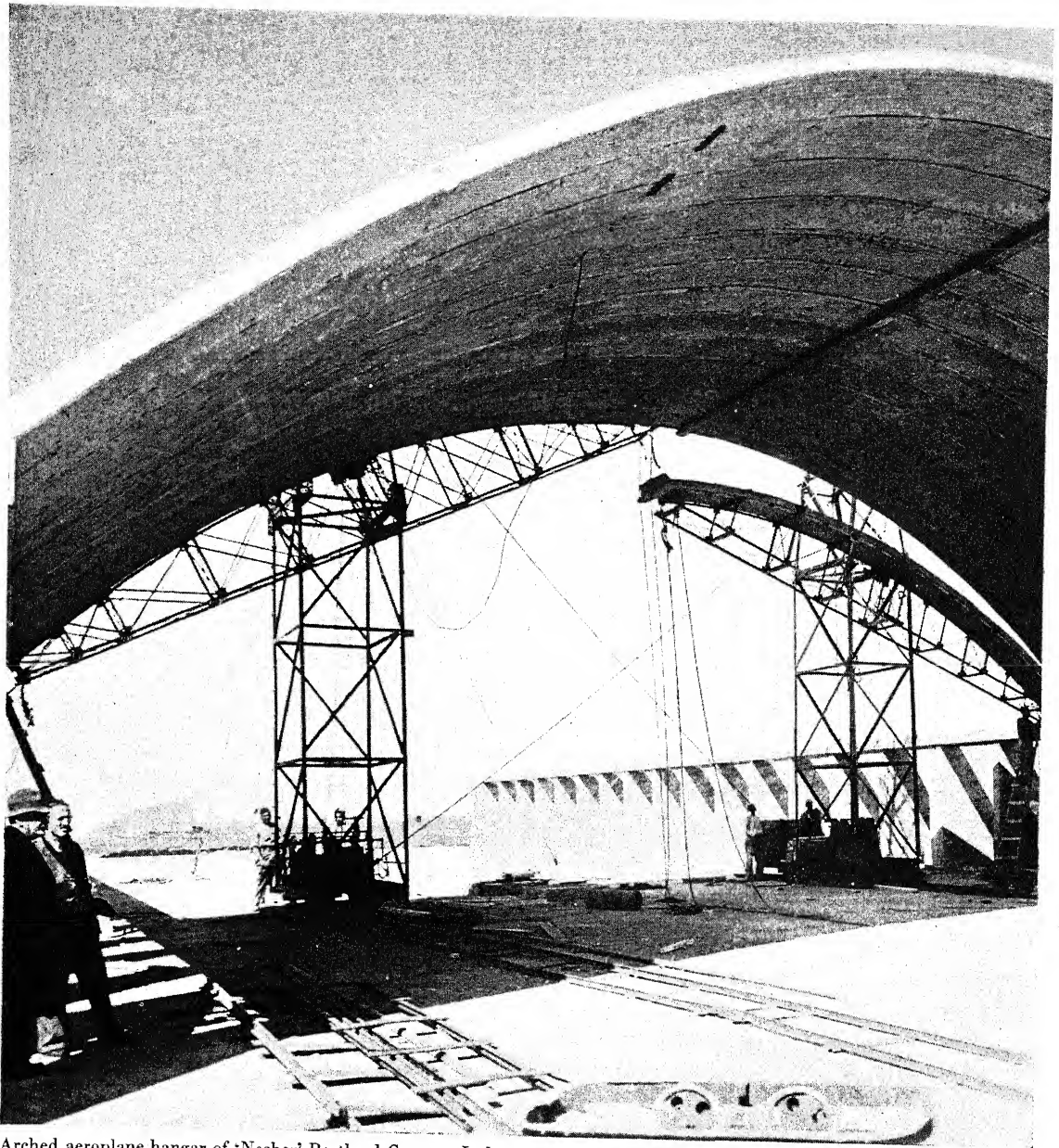


Photo KEREN HAYESOD



Flying school at Afikim, Jordan Valley



Arched aeroplane hangar of 'Nesher' Portland Cement, Ltd.

in which visitors from all parts may enjoy their stay at reasonable cost.

Another steady demand arises from the Moslem world. The annual pilgrimage to Mecca finds Palestine well situated on the India trunk route to cater for the increasing volume of pilgrim traffic in transit.

#### Air Freight.

*Goods by Air:* If the level of industrial activity has its effect on the numbers of air travellers, it bears even more directly on the amount of goods consigned by air. As a world-wide tendency it may be anticipated that the greater pay-loads



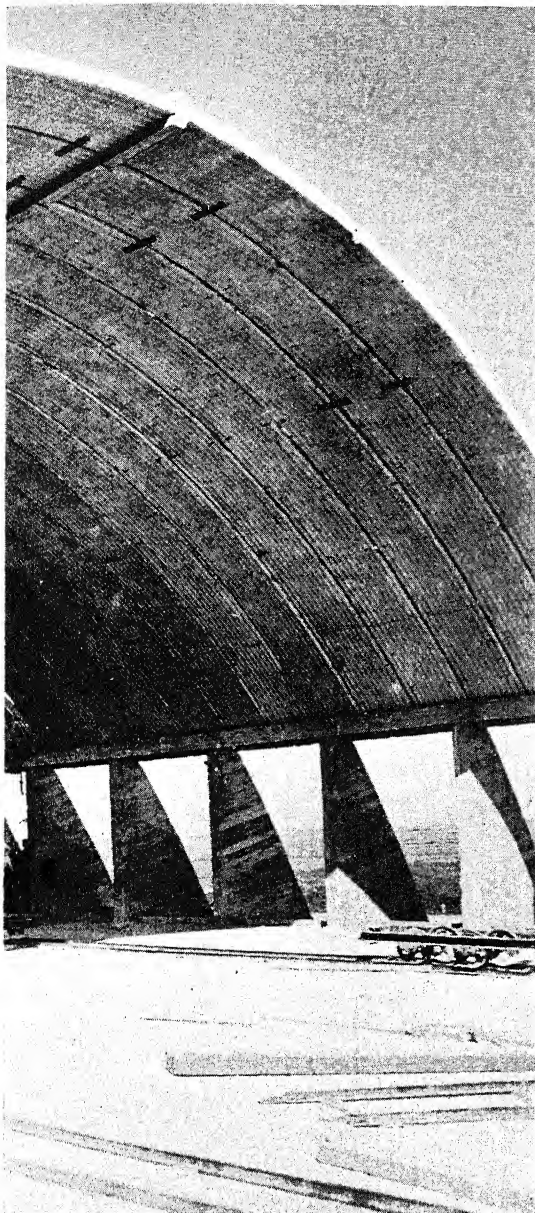


Photo KEREN HAYESOD

carried by post-war aircraft will enhance the air's proportion of total goods carried by all forms of transport. Palestinian trade affords good scope for making-up such pay loads, both outward and inward. There are certain products of the country, such as fruit out of season, pharmaceutical products, and various luxury

goods, which specially lend themselves to transit by air. In the case of certain fruits, indeed, air freight is almost essential for satisfactory marketing; flown from Palestine they can be sold fresh in Western Europe or U.K. at seasons when they are otherwise unobtainable. On the other hand Palestine has steady requirements for manufactured goods of which a proportion is suitable for air transit, can carry the extra costs as compared with surface transport, and merits the attendant swift delivery.

A beginning had already been made before the war, when a modest total of goods was being carried each way by air, as the 1939 figures show:

Airport.	Goods landed (kg.).	Goods leaving (kg.)
Haifa (seadrome)	8,830	9,896
Lydda (airfield)	32,617	4,036
Tiberias (lake)	2,173	191
Tel Aviv (airfield)	252	3,512

With the re-opening and modernisation of air lines and expanding general trade, the air freight into and out of Palestine may be expected to show substantial increase.

*General Trade:* The volume of Palestinian imports and exports indicates the progress of this trade as compared with that of neighbouring countries. Some representative figures are:

*Imports (per capita) 1938 :*

Palestine £8,

Egypt and Syria £2.3.

*Total foreign commodity trade (per capita) 1938 :*

Palestine, £11.4 ;

Egypt, £4.1 ;

Iraq, £3.5 ;

Syria, £3.2.

*Cargoes discharged (per capita) 1937 :*

Palestine, 0.71 tons ;

Egypt, 0.36 tons ;

Syria, 0.15 tons.

*Cargoes loaded (per capita) 1937 :*

Palestine, 0.37 tons ;

Syria, 0.05 tons.

As a centre of commercial activity and hence as a focus for air freight, Palestine had already achieved an outstanding position in the Middle East. This was but a stage in the country's industry, as is demonstrated by the comparative port statistics; for instance, between 1925 and 1938 the tonnage of ships

entering Haifa rose by some 700 per cent., as compared with an increase for Beirut over the same period of 60 per cent. Given a stable political atmosphere, there is no reason why this growth should not continue vigorously.

#### Air Mail.

Air-mail, no less than freight or passenger traffic, is largely a function of the general level of economic life. Sufficient has been said above to indicate the vigorous character of Palestine's growing industrial activity; to this may be not irrelevantly added cultural activity, which permeates the whole country from the Hebrew University downwards. There is thus a public predisposed to the use of air-mail facilities, and the air-mail habit was steadily increasing before the war; the weights carried in 1939 were 54,018 kg. inward and 44,290 kg. outward. These totals should be greatly expanded under the influence of the general economic development and the spread of the use of air-mail.

#### America-Middle East Air Services.

Some features of air-line operation between U.S.A. and Middle East may repay special attention. Before the war no such service existed. Undoubtedly the Americans will become active in this field. The war-time operations of their Air Transport Command indicate Lisbon and/or Dakar as likely localities of entry for them. In either event, Palestine lies a little off the great circle route to India and is also not on the S Africa route. Geographical considerations, however, are not the only ones which determine air-line plans, and it may well be that détours, via Palestine—representing but one or two hours extra flying-time with aircraft now projected—will be worthwhile for economic reasons.

For instance, a U.S.A.-India route via Athens and Lydda, though not the shortest distance, would traverse a far more densely populated and industrially active area than if planned on a purely navigational basis. Again, American trade with Palestine is itself a potential factor to be reckoned with.

Palestinian imports from U.S.A. were just under LP2,000,000 in 1939 out of a total import trade

of LP14,633,000. In 1942 the two million mark was exceeded. About 80 per cent. of imports from U.S.A. consist of manufactured goods. An increase in all Palestinian imports of this nature may be expected, in view of the deferred requirements, repairs and replacements which have accumulated during the war years; it is reliably estimated that up to £10,000,000 worth of industrial machinery is needed immediately. Trade with Britain will undoubtedly benefit greatly from such demands, but a proportion will probably still be met from U.S.A.

Of manufactured goods previously imported from U.S.A. such items as small machine components, tools, and spare parts are suitable for air transit, and the more urgent the need, the greater will be the advantage of the resultant quick supply.

Before the war Palestinian trade (import) was split up roughly into the proportion: 50 per cent. from Europe (including U.K.), 20 per cent. from British Empire, 15-20 per cent. from neighbouring countries and 10-15 per cent. from America. Air transit of express goods offers a saving of time to the American exporter. A volume of passenger and mail traffic commensurate with the trade activity is also to be catered for, but the proportion going by air may be expected to be higher in the case of America by reason of the greater significance of the time factor in the 5,000 mile run involved.

#### Feeder Lines.

The shape of trunk routes to come is not yet clear. While Palestine's position on the India run seems secure, it is problematic whether routes to the Far East, such as Air France used to operate, will include a landing on Palestinian territory, and the British route to S. Africa cannot be expected to do so. The value of feeder lines suitably connecting Palestine with trunk route stopping-places is apparent, and there is a corresponding field open to enterprise. The flourishing Misr line, by which the traveller from Palestine can join the S. African plane in Egypt, is a case in point. Such lines should also derive revenue from the increasing coming and going between Palestine and neighbouring countries.

There has been much airfield construction during the war, but not all the airfields used by the R.A.F. in Palestine will be suitable for civil aviation, even if available. The main airport of the country will continue to be Lydda, where great extensions are in hand. Lydda will be capable of taking the largest civil aircraft and a considerable volume of traffic. The new airfield at Tel Aviv should also have its part to play as the use of smaller aircraft for local services or special charter work extends. Big flying-boats will be able to use the Dead

Sea and/or the Lake of Tiberias as hitherto. The provision of repair and maintenance facilities should be eased by the good local supply of skilled and specialised labour. Some 5-6,000 young Palestinians will be demobilised from the R.A.F., their ranks including men trained in the chief specialist trades. A fair number have become pilots or navigators. It is to be hoped that a good many of these young men will be given an opportunity to help in building up civil aviation in Palestine, an attractive task to which they will bring the same enthusiasm and devotion which have pioneered the development of their country in other fields.



## **Children and Youth Aliyah**



***Movement for the Settlement and Rehabilitation of Homeless Jewish Children  
in Palestine***

J. B. Hobman

## Editorial Note

Field Marshal Smuts has sent a moving personal appeal in his own handwriting as a foreword to this section describing the work and financial requirements of the Youth Aliyah Movement, for which *Palestine's Economic Future* is published:

7.11.45

Prime Minister's Office,  
Pretoria.

*I send Youth Aliyah Organisation my warm good wishes for the success of their appeal on behalf of settlement of Refugee Children in the National Home. Their cause is beyond the sad controversies of our time, and appeals to our deepest human sympathies. "Of such is the Kingdom of Heaven." Let this remnant be planted in the soil drenched with the blood and tears, and hallowed with the prayers of their ancestors.*

J. C. Smuts

Since 1933 the Youth Aliyah has provided a secure and settled home, and given occupational and citizenship training in Palestine to more than twenty thousand child victims of Hitlerism; and this humane crusade must go forward. The origin and history of Youth Aliyah, on both its pitiful and remedial sides, will be found in fuller detail in Mr. Norman Bentwich's recent book, *Jewish Youth Comes Home*.

Special thanks are due to all the contributors to "Palestine's Economic Future" and to many other workers and friends who have so willingly co-operated in the making of the book, to which Mr. Ephraim Broido has given valuable editorial assistance.

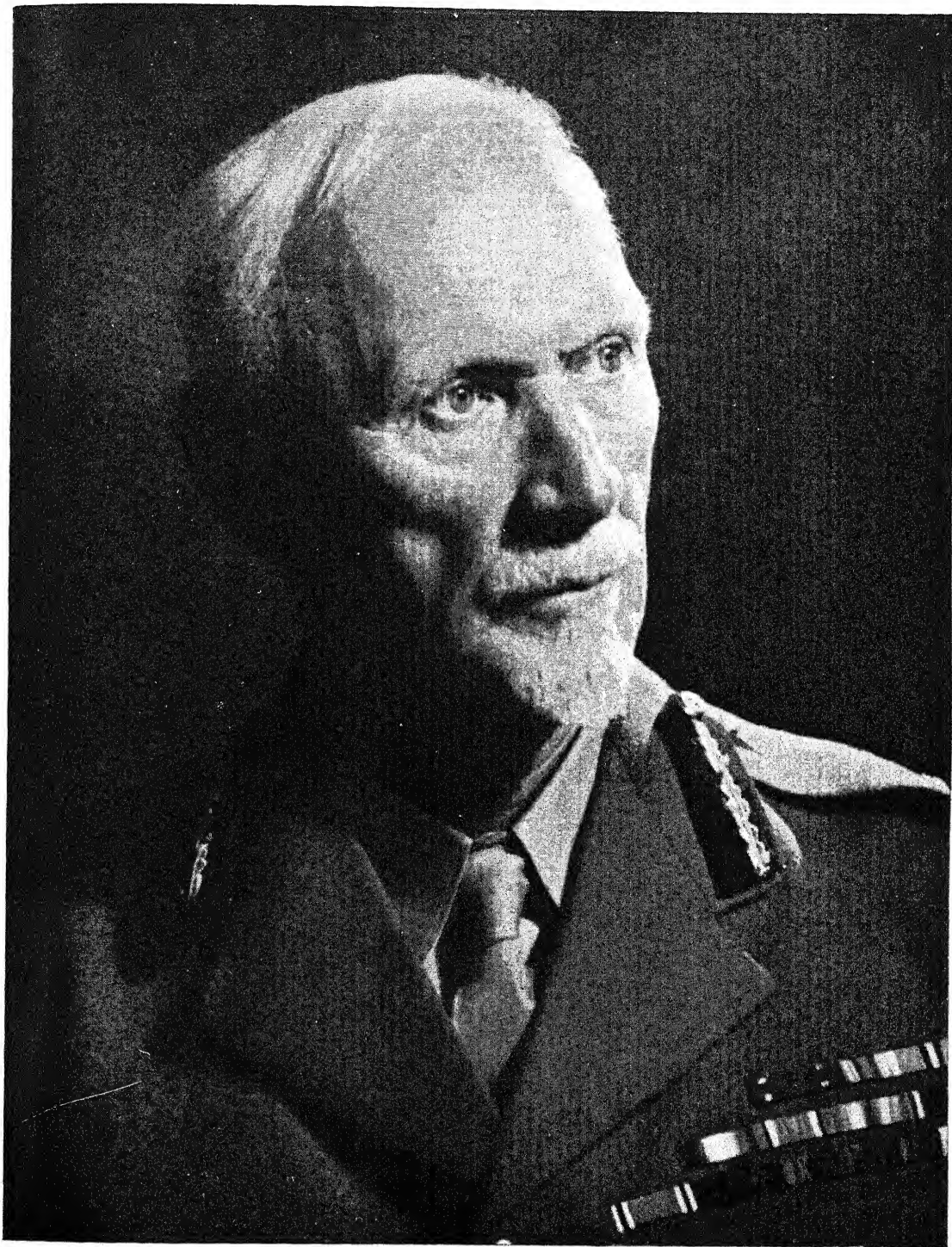


7. 11. 48

Prime Minister's Office,  
Pretoria.

I send you the African Organisation my warmest wishes for the success of their appeal on behalf of letterman of Refugee Children in the Natal Home. Their cause is beyond the sad controversies of our time, and appeal to my deepest human sympathies. "Of such is the Kingdom of Heaven". Let this remnant be planted in the soil enriched with the blood and tears, and hallowed with the prayers of their ancestors.

Facsimile of message from Field Marshal Smuts



*Photo FAYER*

Field Marshal J. C. Smuts, P.C., C.H., D.T.H., LL.D., Prime Minister, Union of South Africa



Refugee with the tattooed number of the concentration camp, now a member of Youth Aliyah

Photo GIDAL

*With best wishes in this fight for justice and  
a square deal in which all Christendom should be  
aroused*

*Sincerely,*

*W. Lowdermilk*

Facsimile of message from Prof. Lowdermilk, author of "Palestine Land of Promise"



## The Great Choice

"If all the heavens were parchment and all the trees in the forest pens, and ink the sea and all the water on earth"—one still could not record the suffering of our people in Europe.

I choose this metaphor from the Pentecost recital as the theme for my introductory remarks to this book dedicated to Youth Aliyah, not because of a desire to harass the reader, nor even to evoke sympathy; rather it is my desire, in the midst of overwhelming tragedy, to point out the futility, the inadequacy, of words, no matter how well chosen.

The reader, I am sure, will forgive me for this mood. For I write these lines under the impact of a great event—the first World Zionist Conference in London since the war. Witnessing the ingathering of the Exiles, the dry bones of Ezekiel, as it were, one is involuntarily overtaken by a sense of mysticism. It is perhaps an escape from reality. Silenced for six long catastrophic years they, the remnants, gave utterance to the anguish of their people. One seemed to hear in their voices the last groans of the dying millions out of the depths of the graveyard that is Europe to-day. But one also heard the voice of the living hope; indeed, the only hope—Palestine. The refrain: "Good or bad, we no longer want to be in the *Galuth* (Exile); we want to go home," reverberated everywhere with an insistence at once dignified and yet appalling in its implications of the enormous problem facing the Jewish people, and, to no less a degree, the world at large.

As I listened to these people and, more particularly, as I listened to the young girl from Bialystok, relating to us with a calm dignity, born of valour, her experiences as a fighter in the Jewish underground movement, her first utterance: "It is easier for me to lay a mine than to make a speech"—I understood a little more of the mystery of Jewish survival. My thoughts wandered back to another scene 3,000 miles away—Athlit. In my mind's eye I suddenly saw and remembered the nine-hundred-and-fifty faces I encountered in that camp a day after their arrival in Palestine. The whole tragedy of the Jewish people seemed concentrated in those

nine-hundred-and-fifty faces, just as the unflinching determination of Jewish youth for survival is concentrated in the deep blue eyes of the young girl from Bialystok. I seem to hear them say. "Doomed to hunger and want, bereft of hope, pursued by a merciless enemy, at long last crumbled to dust, we refuse to die. With our bare hands and bare feet we will climb steep mountains, desolate and neglected though they be; we shall descend deep into the valleys, marshy and pestilential though they be, there to build a future for ourselves and for our children. We are determined to take destiny into our own hands, mould it, fashion it, recreate it, in accordance with our own will. The world cannot deny us this right, this inalienable, human right."

In its broadest sense this is the implication of Youth Aliyah: We refuse to die—we shall not die. From our loins a new people shall arise, stronger, more powerful, living in greater dignity, in greater security on its own soil, no longer entirely dependent on the will of others. Our strength will be the measure of our security. And if the strength of a people, like the strength of a movement, is measured by the power with which it resists destruction, its greatness is also measured by the power with which it resists degradation. Alas, we have been too weak to resist destruction for millions of our people, but we have been strong enough to resist degradation. There are peoples and movements which are strong enough to avoid physical annihilation, but not great enough to retain in survival their moral quality. Of the strange and magnificent phenomenon called Youth Aliyah this must be said: It represented the highest moral achievement of Zionism in the days when the enemies of Jewry and of mankind hoped to see the movement reduced to a wild and chaotic scramble for individual survival.

Let the meaning of Youth Aliyah be clearly understood. It is something more than a manifestation of the universal instinct of guardianship for the new generation, and something more than a manifestation of parental tenderness. It is that, too. But over and beyond that it is



Orphaned children from Poland who reached Palestine via Russia, Siberia and Persia in 1944; (known as "Teheran Children")



The youngest "Teheran Children"

a deliberate assertion of the very highest national policy in the face of the most disastrous and most discouraging circumstances. In the face of the destroyer the Zionist movement was compelled to portion out life and death according to the best interests of the people and its tradition. For what were the special immigration permits reserved for children, and therefore by bitter, necessary, implication, withheld from adults, if not an apportionment of life and death? What a terrible choice! And yet the choice had to be made.

Apart from the elementary instinct to save human life, what were the interests which Youth Aliyah served? In the simplest terms it can be stated thus: the investment of the best element, the youngest, the element with the longest value, in the building of our national life. Thus pity, which might have become panic, was sublimated into statesmanship. And even the word statesmanship does not cover the scope of Youth Aliyah. For there is in it an echo of that far-off choice which attended the birth of our people—the Youth Aliyah which Moses

instituted when it was decreed that the older generation should perish in the Wilderness, while the younger generation was reserved for the Land of Promise.

To what degree were the initiators of Youth Aliyah—Recha Freier and a small group of men and women—conscious of all these implications when they began in 1932, against external obstacles and internal incomprehension, to press for the rescue of Jewish children from Germany by their transference to Palestine, their rescue at all costs, under all circumstances? There was perhaps in the founders of Youth Aliyah a prophetic understanding of the time which was to come, of the imminent doom of German, Central and East-European Jewry; they thought not only of individual young lives, but of the strategy of the generations. In this war for Jewish survival, youth became for them the first priority—almost without a second. Youth which could be moulded in Palestine; youth, mobile, adaptable, ready to throw off their recollections of the Exile, eager to receive the imprint of freedom, youth between the

ages of 14 and 16—they were to become the spearhead of to-morrow's Jewish advance. It does not matter to what degree they understood the greatness of their own vision ; it suffices that with it they conquered others : Henrietta Szold and Chaim Arlosoroff. And within a year committees sprang up over the whole Jewish world, capturing the imagination of thousands of individuals and of great organisations.

For the Jewish people was touched to the quick. There was an instinctive understanding of the issue. Slowly at first, but gathering in volume as it went on, Youth Aliyah reached into the dwindling communities, garnering here an individual child, there a handful, elsewhere a group. And in Palestine the instruments of reception expanded and were perfected. Youth Aliyah became a great and solemn tradition in half a decade.

As I write these lines I am plagued by the thought: What will be our future course of action ? The war is over, the enemy has been destroyed, the tragedy of Jewish life is revealed to us in all its nakedness. In a sense I believe we stand before a problem more urgent, more immediate, than that which faced us before and during the war. Imminent danger would seem to be over, the pursuer has become the pursued, the threads of life somehow or other are kept together. Mothers, if they are alive, no longer fear the death of their children by the hand of the persecutor. At worst, it is starvation, exposure, homelessness, a fate—so we are told—shared not only by Jewish children, but by millions of others. These are the echoes of former years. And we are told : It is a universal problem, and as such it must be dealt with. We must avoid dealing with Jewish children as a distinctive problem, we dare not be too separatistic. Nay more, if Jewish children are in

Christian institutions, let them remain, if the institutions desire it, as a token of our gratitude to the good people who saved their lives. As for the rest, they will be cared for by well-meaning survivors capable of doing so, or by our own charitable institutions.

This is a snare and a delusion. It is the voice of disintegration. This, it seems to me, is the paramount danger. And it is pertinent to ask : Will the world listen to the sepulchral voices, or will it respond to the voice of the Jewish girl from Bialystok : “ Good or bad, we no longer want to be in the *Galuth* ; we want to go home.” Yes. The Jewish children and youth want to go home. They belong to us ; they are our treasure, the only one left to us in our impoverishment. Of this last possession we shall not be robbed. This is the problem. This is the choice. Indeed, the choice before us to-day is more urgent than that which faced us in 1933. If this be our choice, and there is no other, we and those who will come after us will be able to recite with dignity and unsullied conscience—as was done in the generations before us—that ancient prayer in memory of those of our millions who perished in the sanctification of His Name. Let it not be said of us that because of our neglect they have died in vain:

“May He who maketh peace in high places, make peace for us and all Israel, and say, Amen.”

If this book serves, if only in small measure, to help the world understand our anguish in this critical period of our history, it will have done its share. To all those who have helped to make it possible : contributors, donors, editors, friends—to all I extend heartfelt thanks on my own behalf and on behalf of Youth Aliyah and the Book Committee which sponsored the publication of this volume.

## Statement on Youth Aliyah

As a result of the rise to power of the National Socialists and the subsequent injustices visited upon the Jewish people and their children, the need for child emigration arose, and so an organisation named the Children and Youth Aliyah came into being. The work of this organization started in 1933. From 1933 to October 1st, 1945, under its authority 16,179 children were sent to Palestine. Upon the arrival of the children in Palestine, Children and Youth Aliyah became financially responsible for their maintenance and vocational training, the purpose of which was, and still is, to make them self-supporting.

From 1933, when Children and Youth Aliyah was established, until October 1945, the total income of the organization amounted to LP2,638,370. Of this total the main contributors were: Hadassah (U.S.A.), LP1,453,175, England, LP231,961; South Africa, LP235,353, and Canada-Wizo, LP137,613.

Based on these financial contributions from various parts of the world, Children and Youth Aliyah was enabled to perform its task and to balance its income and expenditure. It did not incur any annual deficits. However, at the present time the situation has become such that the basic financial requirement for the period of one year now exceeds the cumulative expenditure of this organisation for all previous years since its inception.

The increase of the budget required by the Children and Youth Aliyah is due to the greatly increased figures of the new arrivals, and the expenditure of the organization having so remarkably risen.

From 1933 to the outbreak of the war—September, 1939—4,888 children were accepted—4,256 of them from Germany and Austria. During the war—from September, 1939 to August, 1945—Children and Youth Aliyah accepted 10,731 children. Whereas until the war it absorbed child emigration from Germany, Austria, Czechoslovakia and Poland, we have now children from 20 countries including Turkey, Yemen, other middle-Eastern and African countries. During this period the first

children from the Buchenwald and Bergen-Belsen Camps arrived and were accepted by Children and Youth Aliyah in Palestine.

The cost of living index in Palestine has risen from 100 in September, 1939, to 258 in March, 1945

It has become impossible to select the children beforehand or examine them medically. They arrive without possessions or clothing, nor are they given any preparatory training for life in Palestine. They now have to be provided with complete equipment. Simultaneously, it has become imperative to extend all the services of Youth Aliyah, such as educational facilities, agricultural training, medical attention, and social welfare.

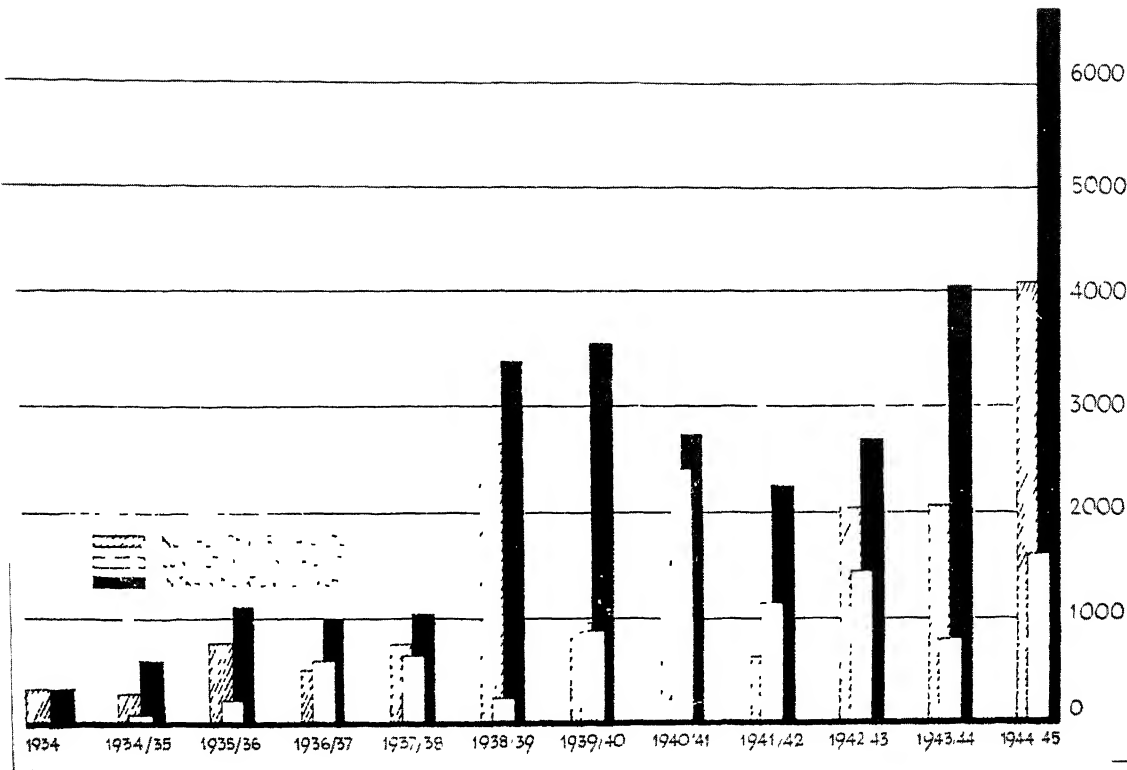
There is, furthermore a considerable increase in the number of wards placed in institutions as compared with the number allocated to settlements. The cost of maintenance in settlements is as follows. LP4 per month per youth for the first year, LP3 per month for the second year; LP8 per month if the child is under the age of 14. The cost of maintenance in institutions is at least twice that of the settlements, the average cost per month being LP12.

The recent increase in the number of younger children in relation to the number of older ones, i.e. the acceptance of children at an early age, implies a double responsibility. Namely a higher outlay as the children are unable to do any remunerative work, and the need to maintain them for a longer period.

It has become necessary to carry out new housing projects to benefit the new arrivals for whom there is not sufficient accommodation.

The Children and Youth Aliyah now faces an enormous task. It has had to build up a new organization on the Continent of Europe. Registration and preparation for the ultimate emigration of thousands of Jewish children, former victims of Nazi oppression will have to be carried out. The number of orphaned and half-orphaned Jewish children on the Continent already accounted for, exceeds 40,000. Children and Youth Aliyah is working on the assumption that it will bring 10,000 children





Barometer of Aliyah entrants into Palestine

to Palestine from Europe in one year. These 10.000 children, plus 5.000 others already in Palestine and under the care of the Children and Youth Aliyah, will bring the total of wards up to 15,000 for whom the Children and Youth Aliyah must provide.  
Based on the aforegoing, the following budget has been put forward :

(a) Maintenance costs for 5,000 children already in Palestine	LP 750,000
(b) Maintenance costs for 10,000 new immigrants	1,500,000
(c) Equipment and other initial expenditure for a and b	250,000
(d) Housing for 10,000 new arrivals	1,000,000
Total	LP3,500,000

Jerusalem, October 1945



Photo CIDAL

The late Director of Youth Aliyah, Henrietta Szold



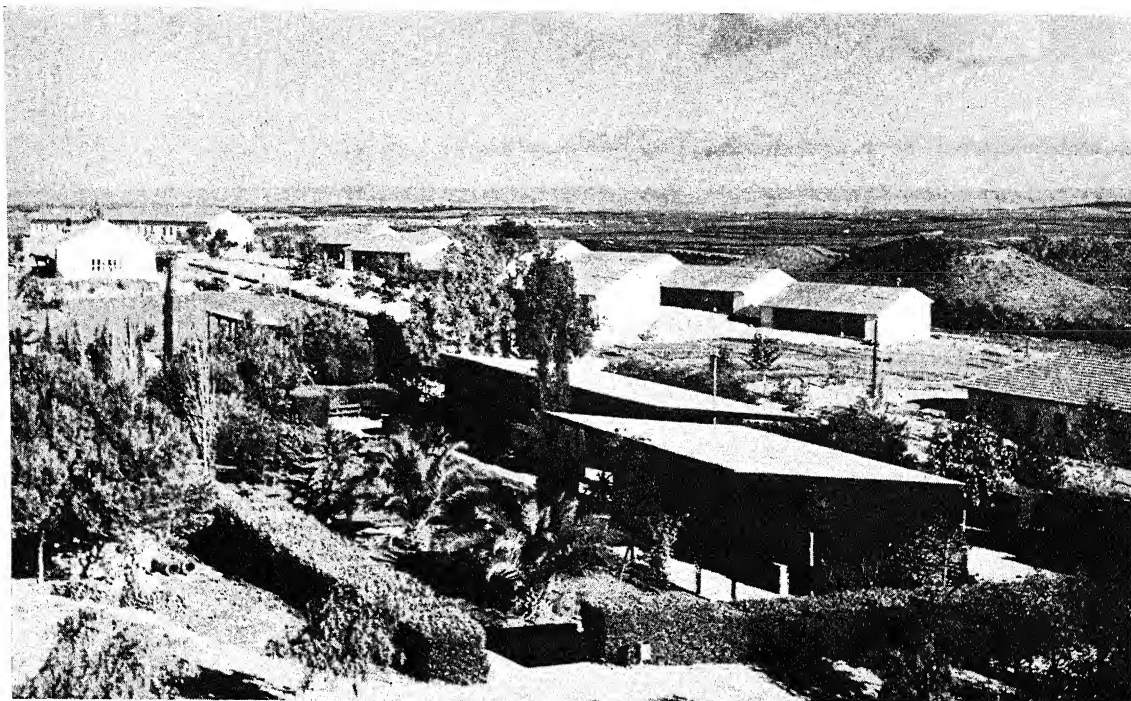
British police escort for newcomers at Haifa

*Photo GIDAL*



Photo CIDAL The late Miss Szold at the Ahava Home near Haifa with the director (Mr. Yashuvi) and three "Teheran boys"





The "Children's Republic" Givath Brenner

*Photo HELLER*



Youth Aliyah group, Afikim



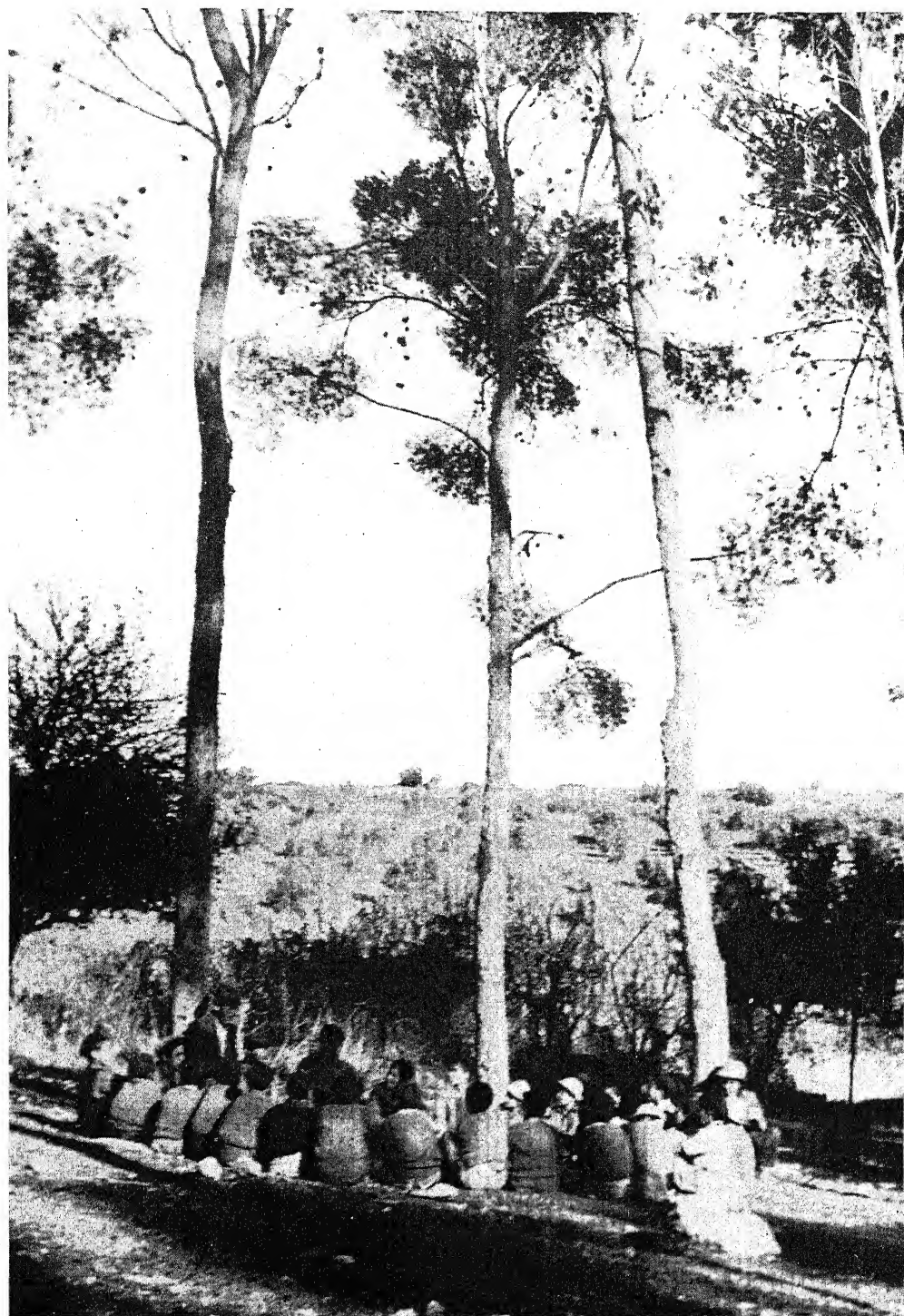


Photo STEINER AND COMERINER Study group of Yemenite children in the children's village of Meier Shefeya



Excursion from Tiberias to Safed by group from Trade School, Yagur

*Photo MEYER*



Photo MEYER

Youth camping on Mount Carmel





Youth Aliyah girls mending clothes at Tirat Zvi settlement

*Photo COMERINER*



Little "Teheran girls" with their instructor





Two girls who reached Palestine from Roumania during the war



The pleasures of country life

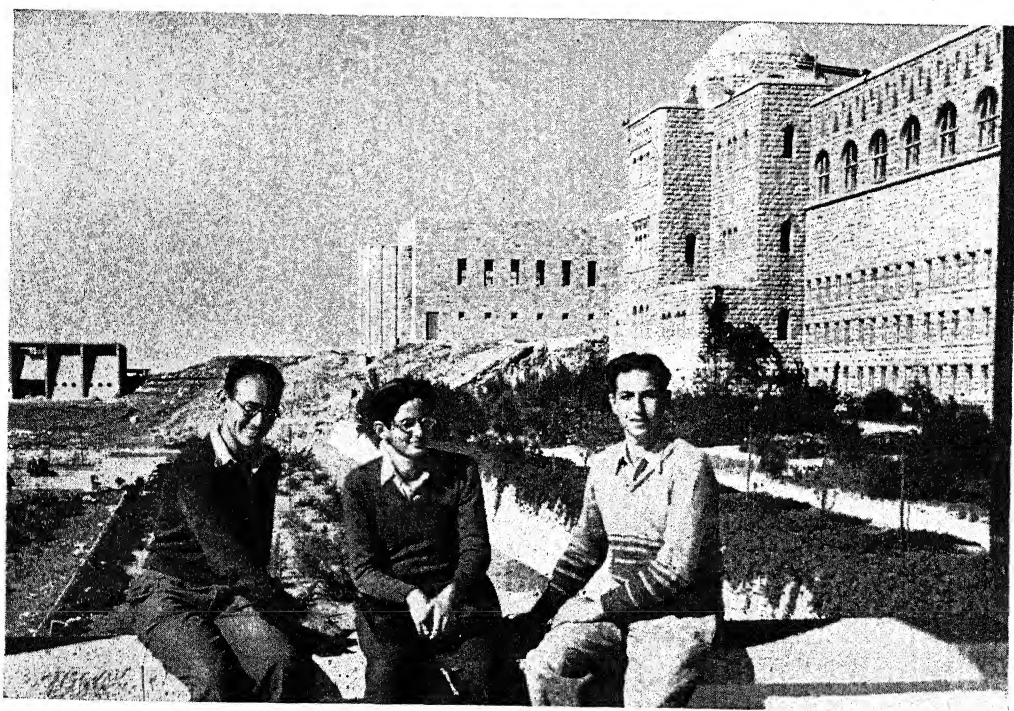


Photo CIDAL

Youth Aliyah graduates, students of the Hebrew University, first holders of the Szold scholarship



Planting a tree in the Henrietta Szold Forest at Maaleh Hachamishah, 1942

*Photo LASAR DUENNER*





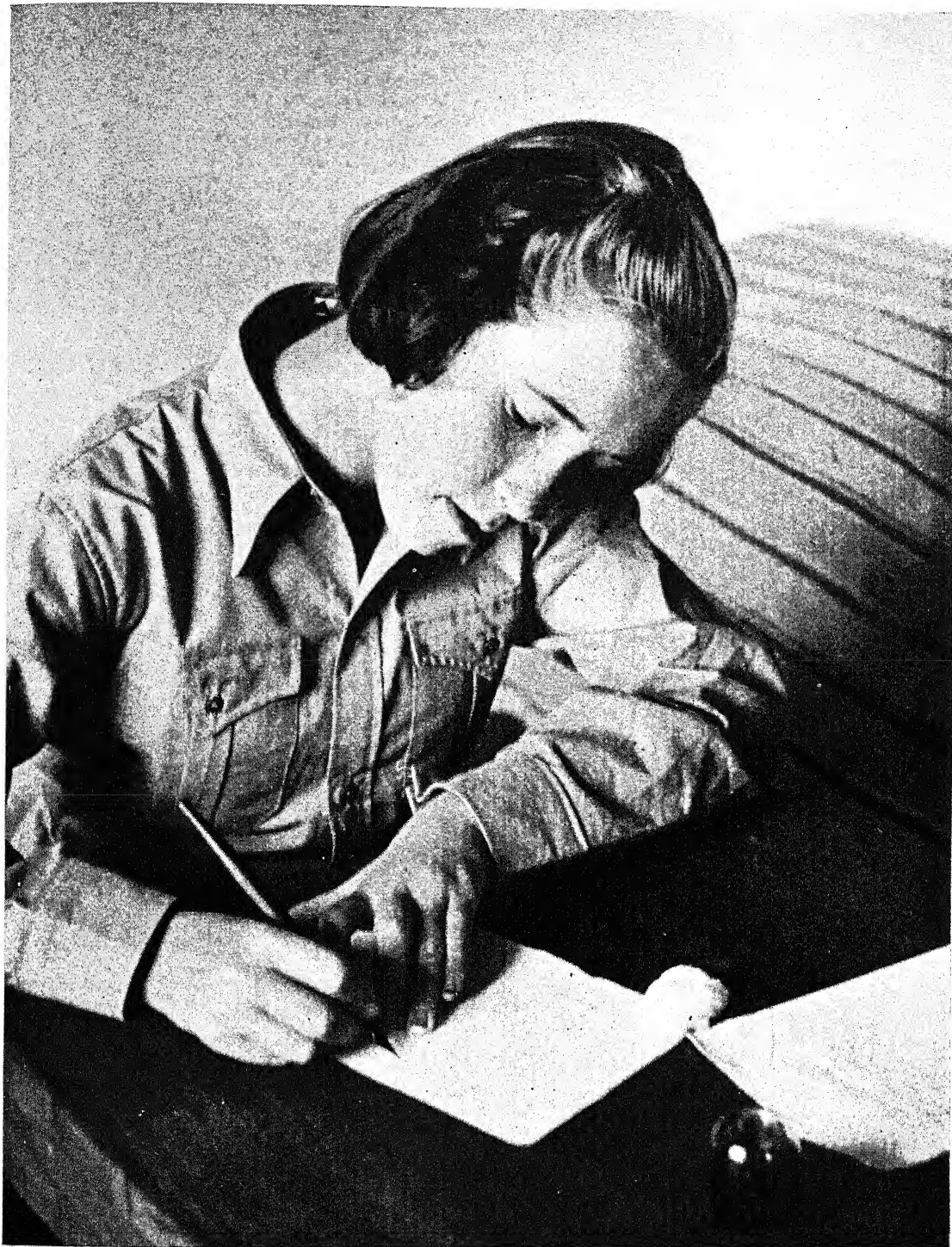
Nursing plants in a Negev terrace at Gvuloth



Young Shepherd (Youth Aliyah)

*Photo W. ZADEK*





Girl from Germany at Alonim, a settlement established by Youth Aliyah graduates

*Photo GIDAL*



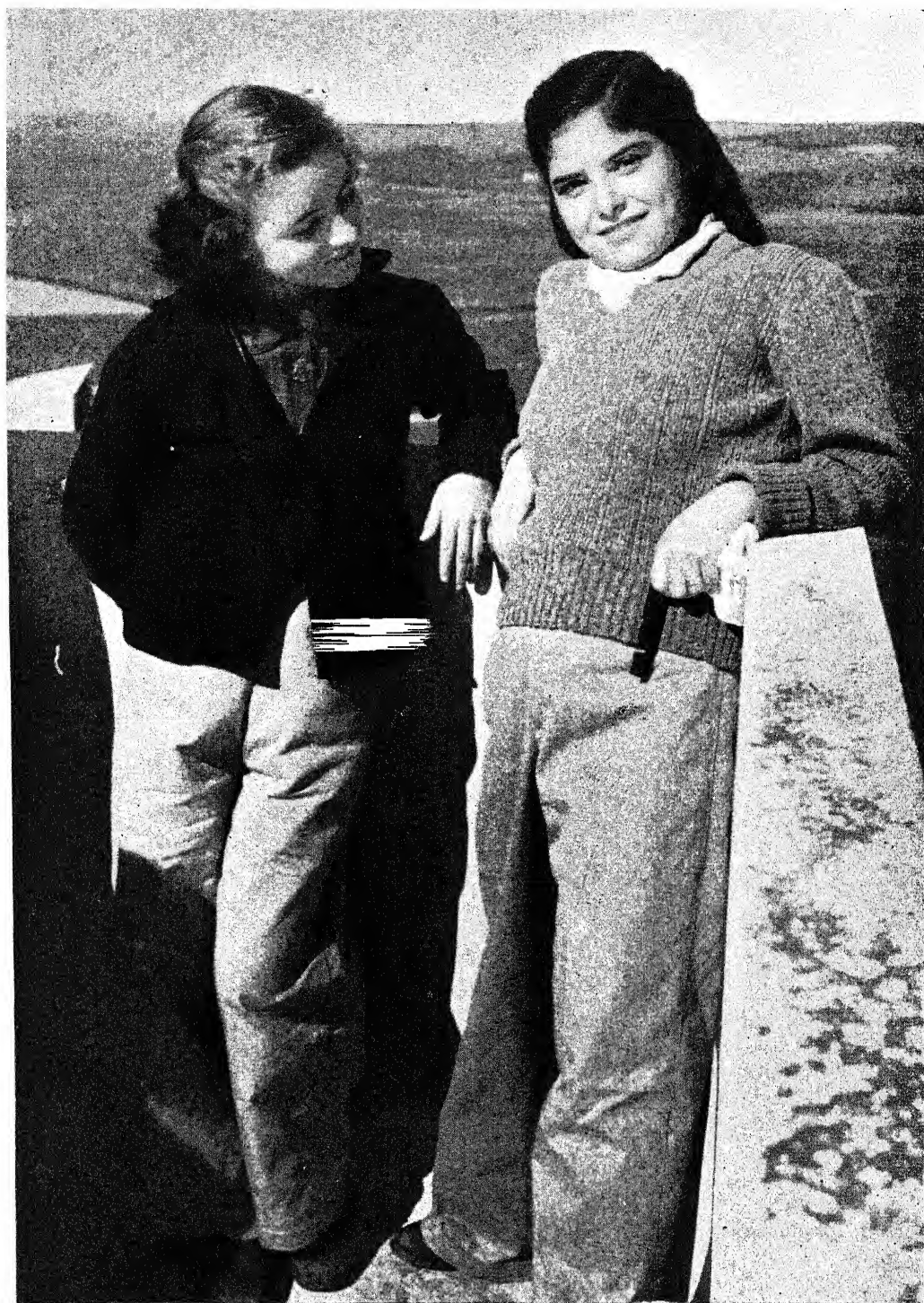
*Photo W. ZADEK*

Youth Aliyah graduate



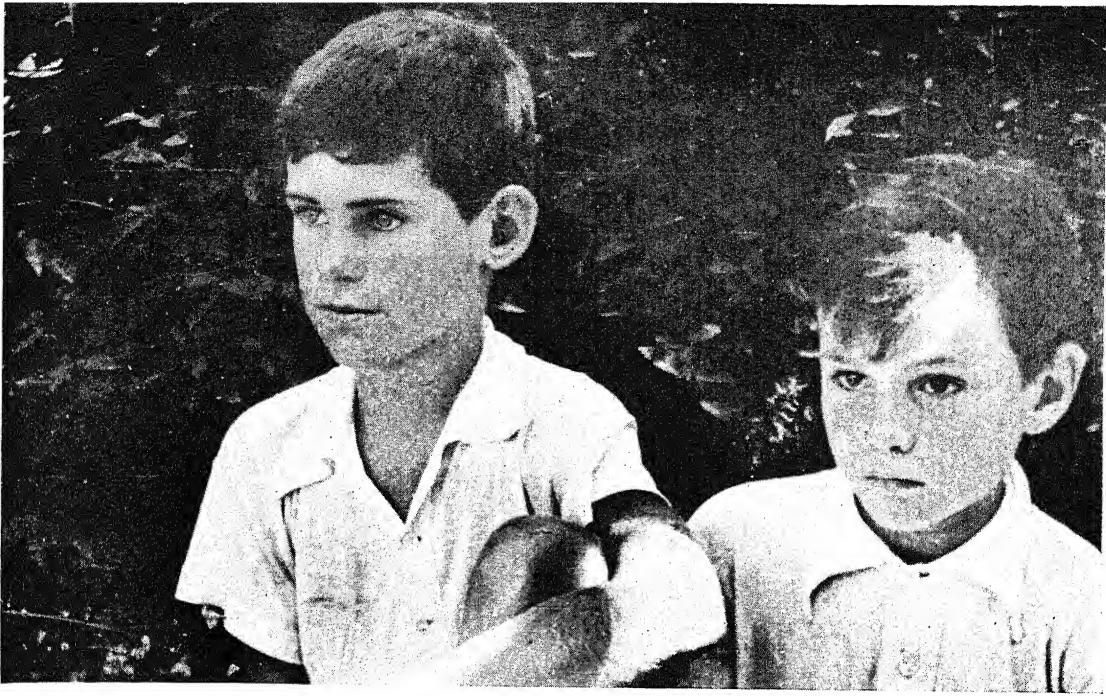
Watering tomatoes in a Dead Sea settlement





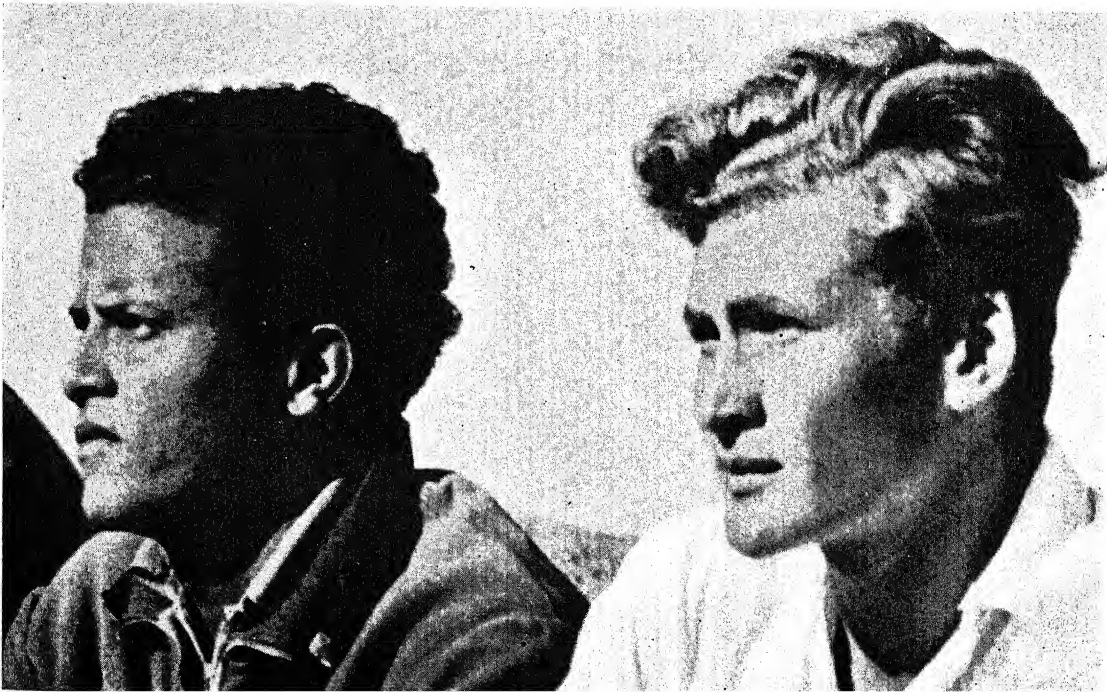
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Future farmers training at Meshek Hapoalot

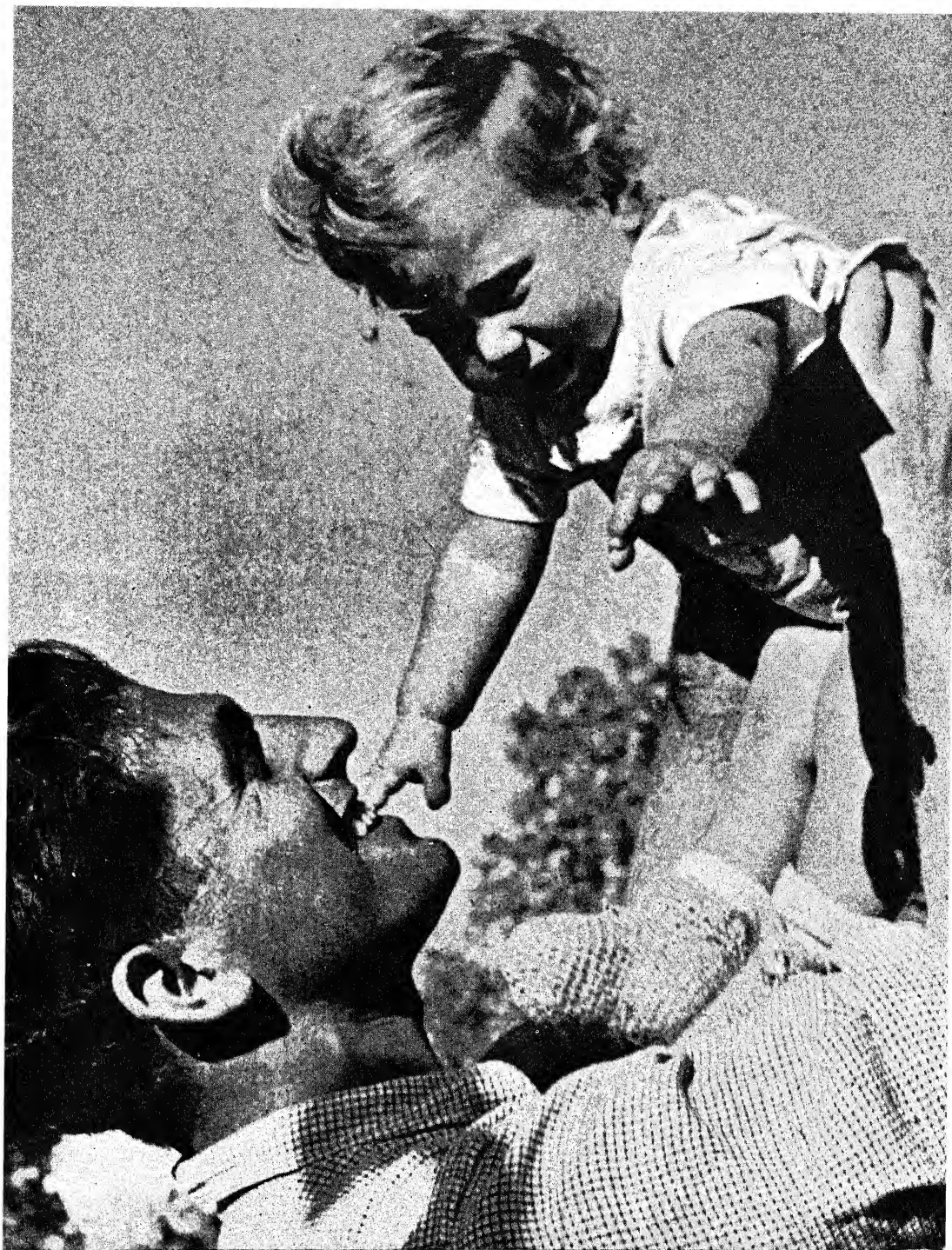


Youth Aliyah

*Photo W. ZADEK*







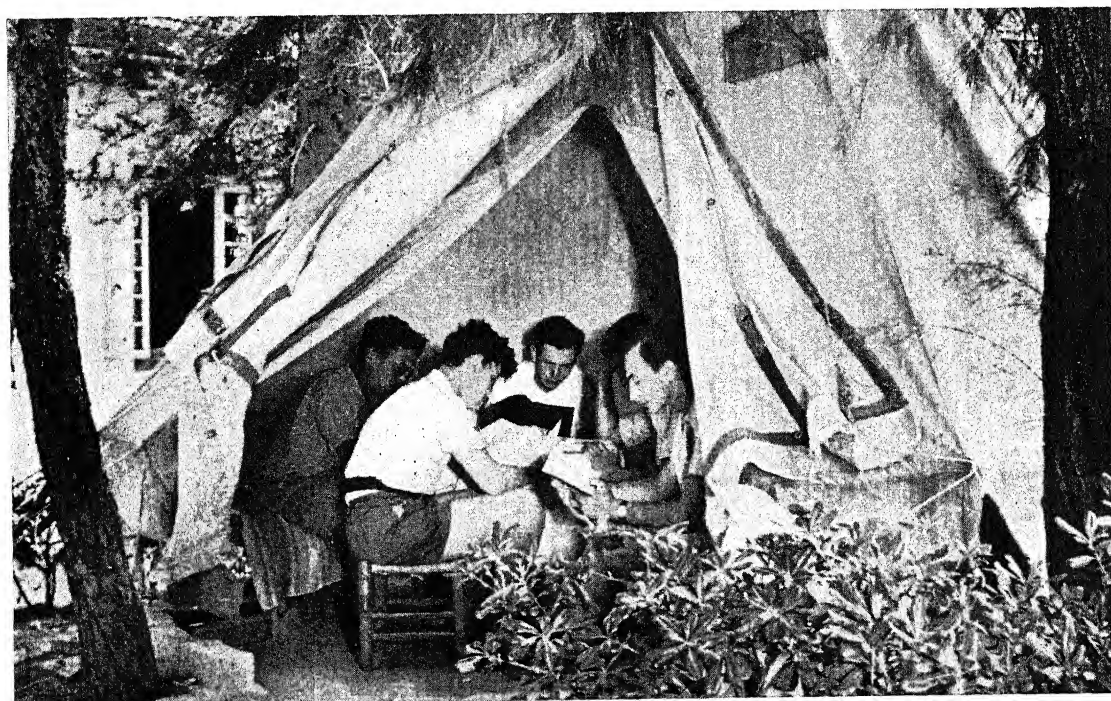
*Photo* JEWISH AGENCY FOR PALESTINE

Aliyah father (Alonim group) and son



Father (from German Youth Aliyah) and son

*Photo JEWISH AGENCY FOR PALESTINE*



Studying under canvas

*Photo W. ZADEK*



*Photo* ALICE HOLZ

Youth Aliyah boy from the Yemen





Landscape from children's village, Meier Shefeya, as seen by two little girls from Yemen *Photo* STEINER AND COMERINER

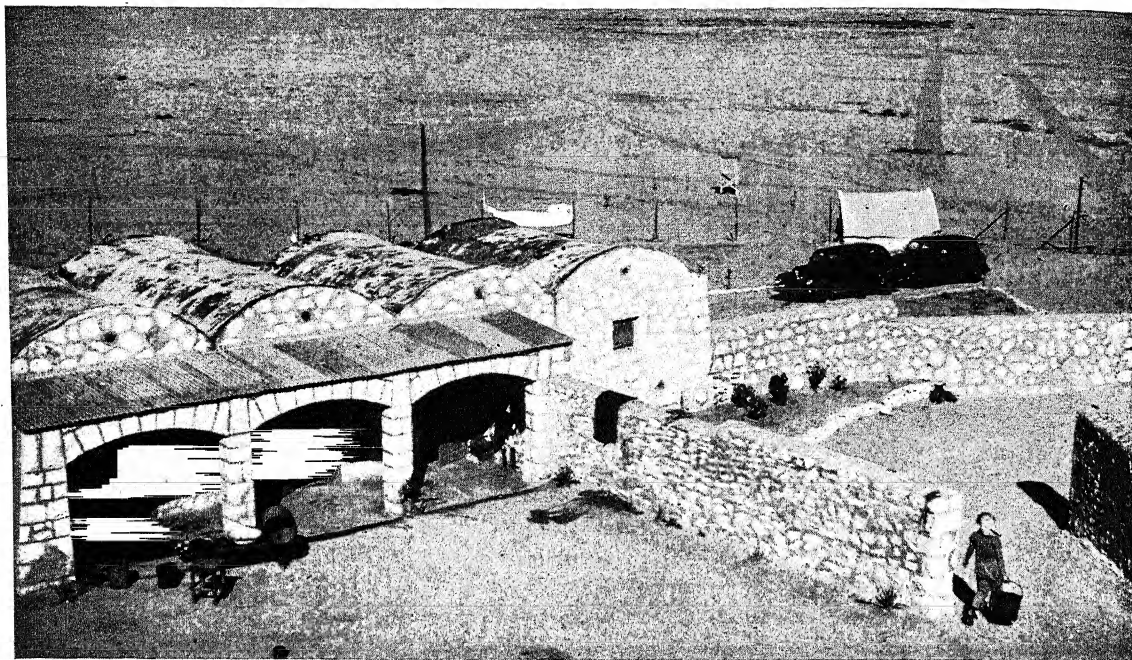


Photo GIDAL

Asluj in the Negev. Built by forty Youth Aliyah graduates as an experiment in irrigation

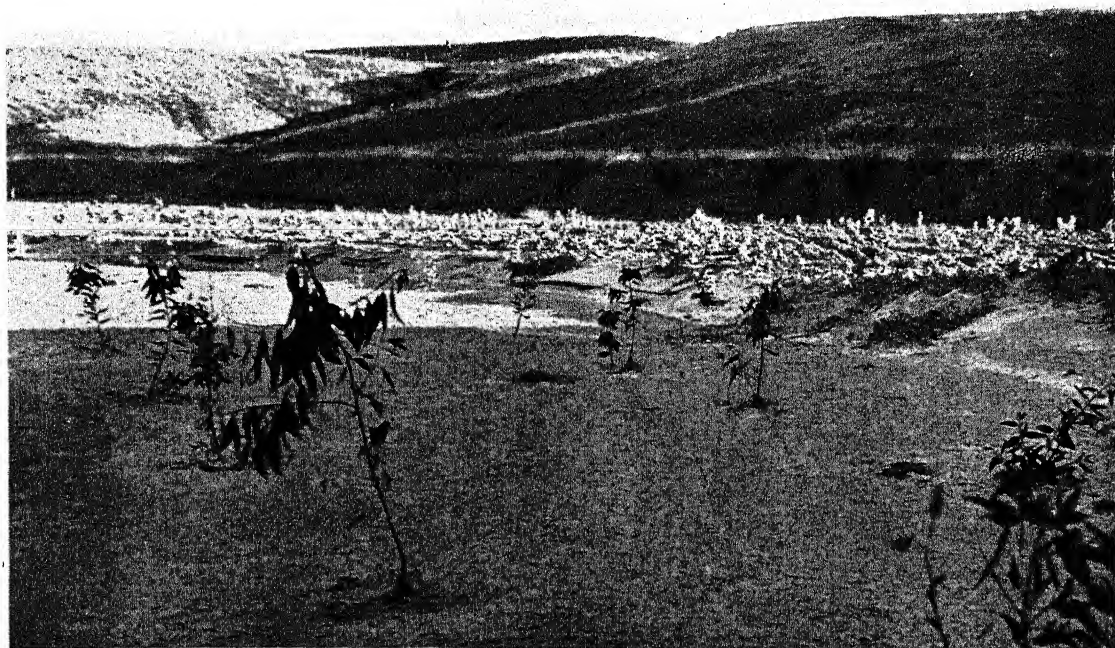


Photo GIDAL

Vegetable garden in Asluj, irrigated by the scanty waters of a well





Youth Aliyah girl in Meshek Hapoalot

*Photo W. ZADEK*

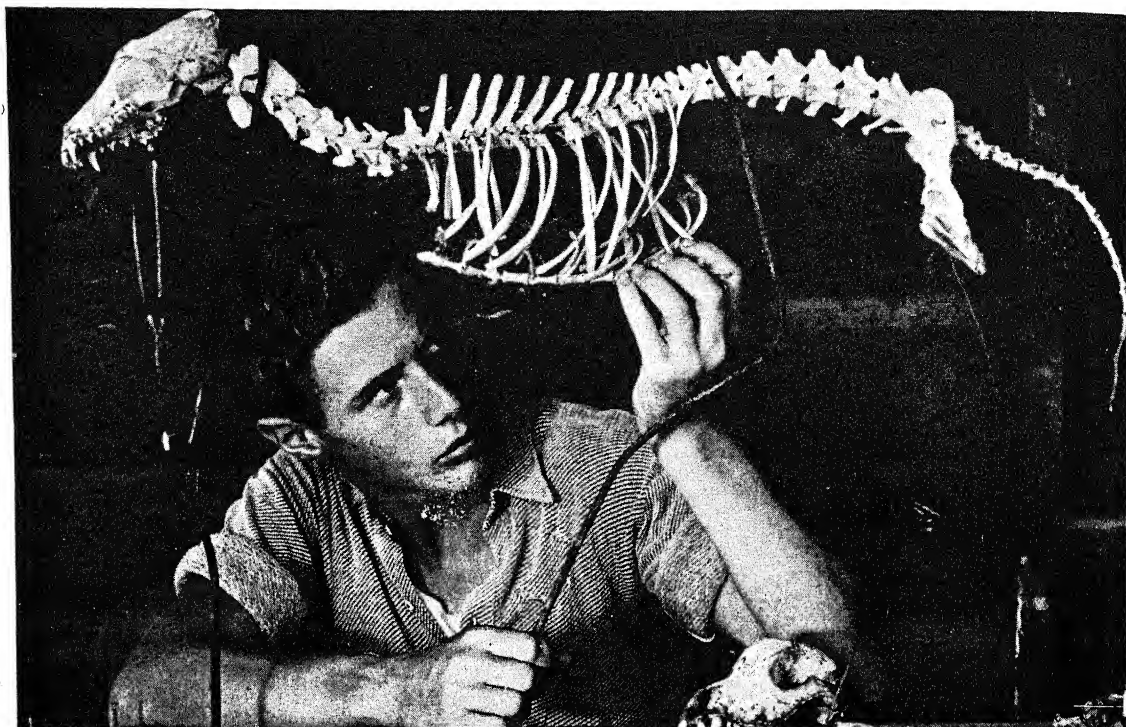


Photo W. ZADEK

Student of zoology at Children's Village, Ben Shemen



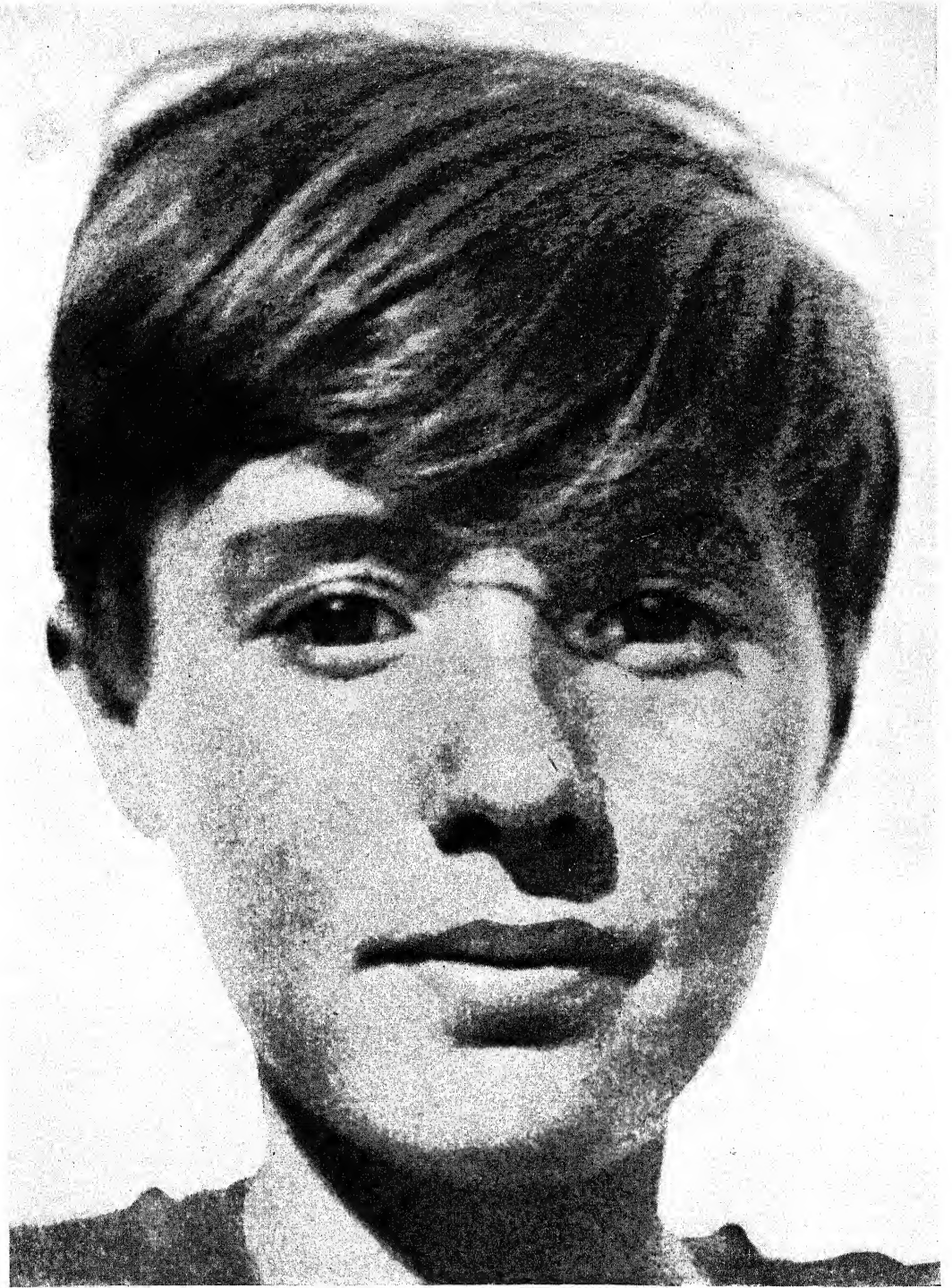
Photo KEREN HAYESOD

Communal hall at Maabaroth



Reading room at Maabaroth

*Photo* KEREN HAYESOD



Child from Germany training to become a farmer in Palestine

*Photo W. ZADEK*

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Palestinian Section . . . xcii–cvi

Index to Advertisers . . . cvii–cx



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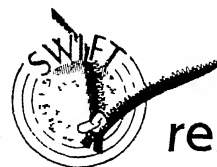
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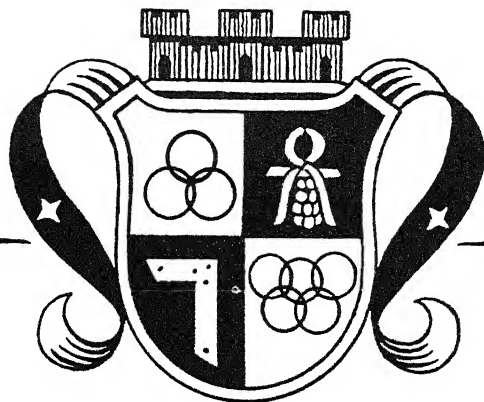
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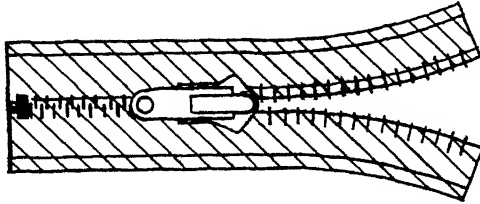
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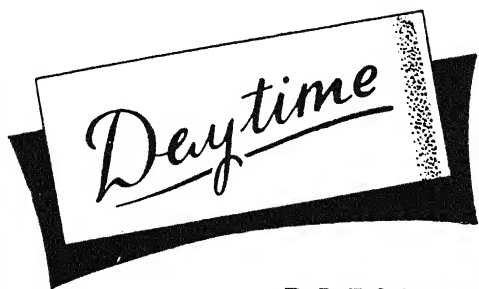
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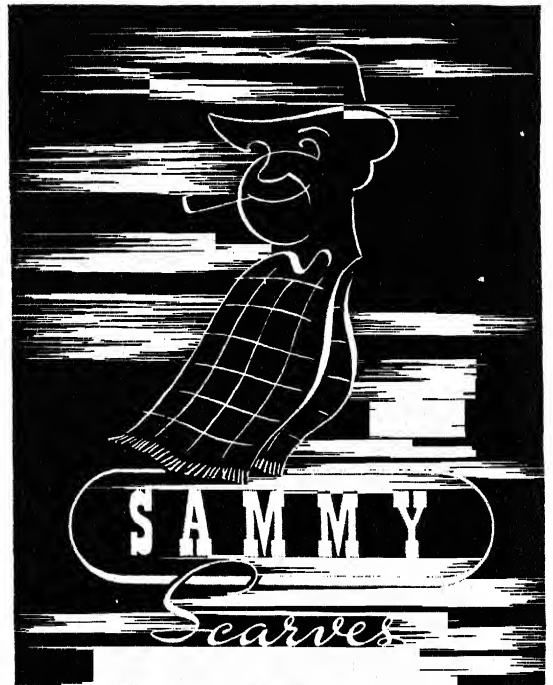
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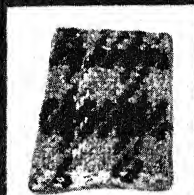
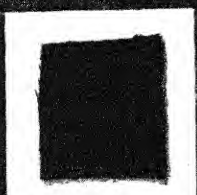
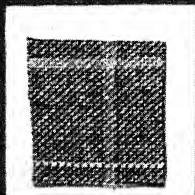
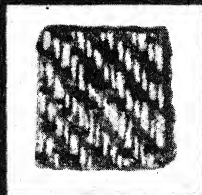
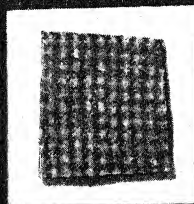
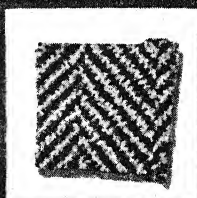
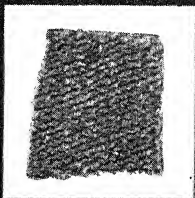
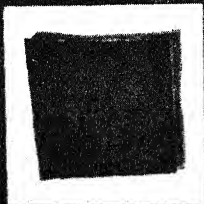
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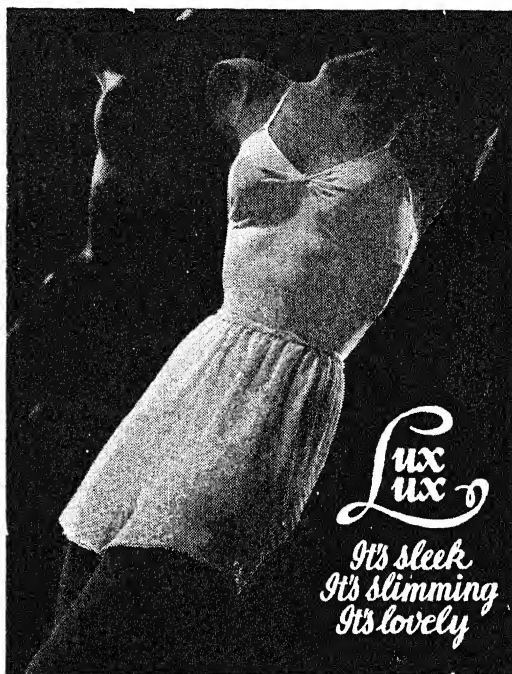
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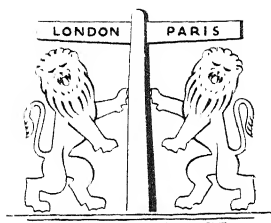
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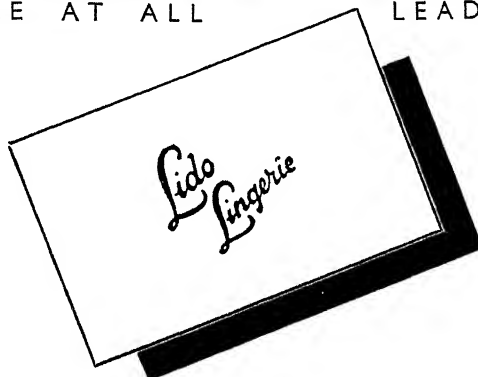


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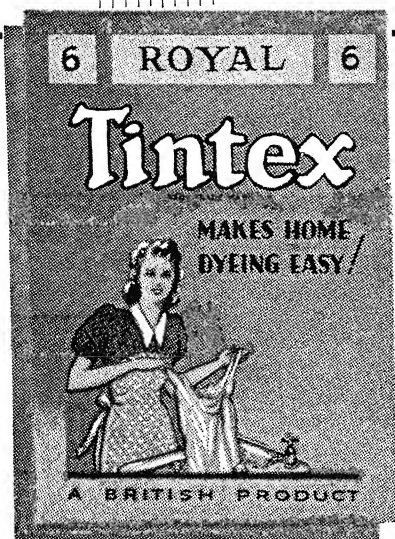
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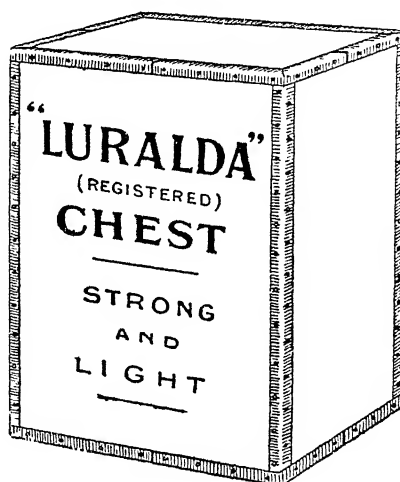
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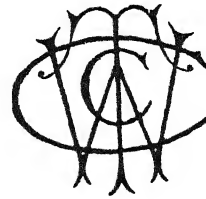
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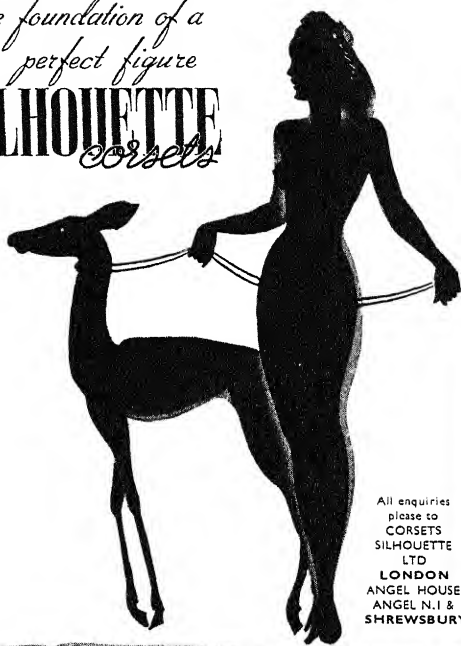
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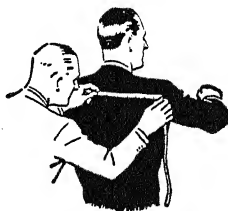
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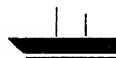
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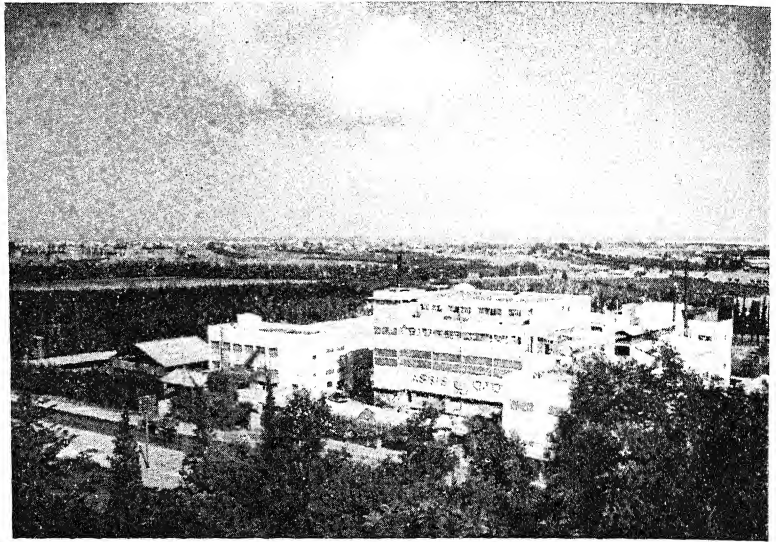
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# Index to Advertisers

	PAGE		PAGE
<b>Textiles, Textile Raw Materials and Products</b>			
ABC Fashions, Ltd. London W 1	xxxviii	Glorex Woollen Co., Ltd., London, W 1	lviii
Van Allan Ltd., London W 1	lxxxviii	R B Gold, Ltd., London, W 1	xxxviii
Arlen Sportswear Ltd., London W C 1	lv	A Goldstein, Ltd., London, E 1	xxxv
Aronson Woollen Co., Ltd., Tel Aviv	cv	Goldstyles, Ltd., London, E 1	xlvi
Arthur and Frederick Ltd., Shrewsbury	xxxviii	Gonshaw, Ltd., London, W 1	xc
J. & B. Ashlev, Ltd., Leeds	lxxxii	Goodrich & Sons, Ltd., London, E 1	xv
Astrel Gown Co., Ltd., London, W 1	xlvi	Gordonia Manufacturing Co., Nottingham	liv
Ata Textile Co., Ltd., Kfar Ata, near Haifa	cv	Gor-Ray Skirts, London, W 1	lxxxix
Auerbach & Steinitz, Ltd., London, W 1	lxii	I & M. Goschalk, Ltd., London, W 1	ii
Charles Barclay, Ltd., London, W 1	lxxxiii	Graceline Dress Co., Ltd., London, W 1	xxiii
B & G Barraclough, Ltd., London W 1	xc	J Green (Robes), Ltd., London, W 1	xl
A Beckman, Ltd., London, E C 1	xlvi	M Greitzer & Son, Ltd., London, E 1	xxxvi
Bellman, Herz & Co., Ltd., Manchester 4	xii	H & B Clothiers, Ltd., London, E C 2	xxxix
Bentex, Ltd., London, W 1	lxxxviii	M & S Haar, Ltd., London, W 1	lxxxvii
Bernard & Lakin, Ltd., London W.1	ix	James Hare, Ltd., Leeds	lxiv
H Bernstein, Ltd. ("Hershelle"), London, W 1	xxxi	E. Harris Mantles Mfg. Co., Ltd., London, W 1	xlvi
M Bernstein, Manchester, 2	lxviii	Kaye Harris, Ltd., London, W 1	xvii
Blackman & Conrad, London W 1	xlx	L Harris, Ltd., London, W.1	vii
Blond Brothers, Manchester, 8	xxxii	G I Harrow, Ltd., London, W 1	xxvii
A Bloom & Co. (Merchants), Ltd., Manchester, 1	lv	Hirsch Fashions, Ltd., London, W 1	li
Bloom & Sinjeck, Ltd., London, W 1	xlvi	Hollywood Dresses, Ltd., London, W C 1	lix
L Brickman, Ltd., London, E 1	xx	M & N Horne, Ltd., London, E C 1	xv
M Brisk & Co., Manchester, 1	x	W Horowicz, Manchester	lxxx
British Textile Fibres, Ltd., London, E C 2	xxvi	N Hyer, Ltd., London, W 1	xxvii
Burberrys, Ltd., London, S W 1	xlvi	M Jackson & Sons (Clothing), Ltd., Newcastle-on-Tyne	xli
Cardex Coats, Ltd., London, W 1	xxiv	Jacoby & Bratt, Ltd., London, W 1	xiv
Cherry, Ltd., London, W 1	lxxxv	Maunce Jaffe, Ltd., Manchester, 4	lxxxvi
J Cohen, London E C 1	lxix	James & Gordon, Ltd., London, W 1	xxiv
Mark Cohen & Co., Ltd., Birmingham, 5	i	Henry Jay (Gowns), Ltd., London, W 1	lxxxv
S I & R Cohen, Ltd., London, W 1	lxx	Jellinek & Howard, Ltd., Huddersfield	lxiii
Sydney Cohen, London, W 1	lxxxvii	S Jerome & Sons, Bingley, Yorks	iv
Conberg, Ltd., Birmingham	lxxxviii	Joyce Lingerie Manufacturing, Ltd., London, E C 2	lxvi
Contex (Max Behrendt), London, W 1	vi	Julius & Co., London, E 1	lx
Kitty Copeland, Ltd., London, W 1	xxiv	Kahn Textiles, Ltd., London, W.1	lxii
G. E. Corbett & Co., Ltd., London, W 1	xxx	Kates Collars, Ltd., London, W 1	lxxxv
Corsets Silhouette, Ltd., London, N 1	lxxxvi	D Kershberg, Ltd., London, E 1	xci
A Cover & Co., Ltd., London, E C.4	xxiv	Kestel & Davy, Ltd., London, W 1	xc
M Craps & Sons, Ltd., London, W 1	lxxxviii	Kornberg & Segal, Ltd., London, E 1	liii
John Davis (Mfrs.), Ltd., London, W 1	x	Lawrence Kostoris & Son, Ltd., Manchester, 1	lxviii
Denham (1933), Ltd., London, W 1	xvi	Chas Kuperstein, Ltd., London, W 1	xxiii
Diana Dresses, London, W 1	iv	Harold Lee (Mantles), Ltd., London, W 1	xxxii
Dick & Goldschmidt, Ltd., London, W 1	xc	Lisscraft Sportswear, Ltd., London, W 1	xiv
Dida Linens, Ltd., London, W 1	lxxxvii	Lodz Textile Co., Ltd., Tel Aviv	iiii
S. M. & P. Drucker, Ltd., London, W 1	lxiv	Luton Silks, London, W 1	xxxvi
M Duke & Sons, Ltd., London, W 1	lxxxix	Lux Lux Lingerie, London, W.1	lv
Louis Edwards & Co., Ltd., London, E.C.1	lix	Lyndale Women's Coats & Suits (Green, Hearn & Co., Ltd.), London, W 1	i
Ellis & Goldstein, Ltd., London, W 1	xxv	Maison Belle, Ltd., London, W 1	lxxxvii
B & S Englander (London), Ltd., London, W 1	li	Manchester Textile Trading Co., Ltd., Manchester 2	lxviii
Evans (Outsized), Ltd., London, W.1	xliv	Marshall, Ingram & Co., Ltd., London, W.1	lxxxv
S. L. & M. Feathers, Ltd., Manchester, 1	lxviii	S. F. Martins (Halifax), Ltd., London, W 1	xc
Fifth Avenue American Dress Shop, London, W 1	xxxv	Massey Fabrics, Ltd., London, W.1	lxiii
Florian Export, Ltd., London, W 1	xxxvii	J. Meek & Co., Manchester, 8	li
Florian Mantles (London), Ltd., London, W.1	xxxvii	Middlemost Bros. & Co., Ltd., Huddersfield	xlvi
Henry Freedman, Ltd., Leeds, 7	xlvi	Louis J. Mintz, Ltd., London, W.1	vi
M Freedman, London, E 1	lxv	Bernard Monty (Mantles), Ltd., London, W 1	xiv
Freedman & Co., Manchester, 1	lxxxvi	Marie Moore, Ltd., London, W.1	xxxvi
F. Friedland, Manchester, 1	xi	M. Morrison & Co., Ltd., London, W.1	lxxxvii



## PAGE

cvi

Watkin and Braham, London, S E 17 lxvii  
 Hyman Wein, Chicago 2 Illinois, U S A v  
 Ralph Wein, New York, U S A li  
 Welsh Products, Ltd, Dowlais, South Wales lxvii  
 S Wolffing, London, E C 1 lxvii

**Plastics, Zipp Fasteners**

Aero Zipp Fasteners, Ltd, Pontypridd, Glam xxvii  
 Flex Fasteners Ltd, Dinas, Glam iv  
 W Horowitz, Manchester lxxx  
 Lacrroid Products, Ltd, London, W 1 lxiv  
 Tom Martin & Co (London), Ltd, London, N W 1 lx  
 Mendle Brothers, Ltd, Porth, Glam xxvii  
 Nicholas (Manufacturers and Exporters), Ltd, London, W C 2 lv  
 Silk Fasteners, Ltd, Manchester, 1 lxvii  
 Stadium Ltd Ware, Herts lxvii  
 Stamford Manufacturing Co., Ltd, London, N 17 lxvii  
 S Wolffing, London, E C 1 lxvii

**Metals, Metal Products, Machinery, Electric Articles**

Abelson & Co (Engineers), Ltd, Birmingham, 26 viii  
 Ambores, Ltd, London, N W 4 lxvii  
 Annual Lamp Co., Ltd, London, W C 2 lxxvii  
 Bell & Frome, Ltd, Edgware, Middx lx  
 British Tungsram Radio Works, Ltd, London, N 17 lxxv  
 British Valve & Electrical Accessories Manufacturing Co., Ltd, London, N 7 xxviii  
 Chiswell Wire Co., Ltd, Watford, Herts xxvii  
 Clifford Aero & Auto, Ltd, Birmingham xxxvii  
 Clifford Covering Co., Ltd, Birmingham xxxvii  
 Clifford Machinery, Ltd, Birmingham xxxvii  
 Derby & Co., Ltd., London, E C 2 lxxxix  
 R G Dixon & Co., Ltd, Wembley, Middx lxxxvii  
 English Numbering Machines, Ltd, London, N 16 lxxv  
 Evolution Accessories, Ltd, London, E C 4 xxxix  
 Fusarc, Ltd, Newcastle-on-Tyne xxxvii  
 Hamat, Ltd, Nachlat-Yitzhak cu  
 Ingot Metal Co., Ltd, London, E 9 xl  
 International Refining Co., Ltd, London, E C 3 xv  
 International Welding Co., Ltd, London, W 4 lxvii  
 Islington Metal & Plating Works, Ltd, London, N 1 xlvi  
 W G James, Ltd, London xxxvii  
 Jeffrey Manufacturing Co, Manchester, 15 lxxxiv  
 W & F Kupler Ltd, London, W 1 lxv  
 Leopold Lazarus, Ltd, London, E C 3 xvi  
 Londex, Ltd, London, S E 20 iv  
 Luxram Electric, Ltd, London, E C 2 xlv  
 Tom Martin & Co (London), Ltd, London, N W 1 lx  
 Metag Ltd, London, W 2 lxii  
 Metal Products (Treforest) Ltd, Treforest Trading Estate, Glam xlvii  
 Midget Rolling Mills, Ltd, Cardiff h  
 Midland Utilities, Ltd, Birmingham, 1 lxxvii  
 Moorgate (Birmingham), Ltd., Birmingham, 15 xii  
 Morleys (B'ham), Ltd., Birmingham, 12 lxiv  
 Motor Components (Birmingham), Ltd, Birmingham xxxvii  
 North London Metallising Co., Ltd, Enfield, Middx xii  
 Ocean (Razor Blade Mfrs), Ltd, Slough, Bucks vi  
 Omes, Ltd, London, S W 13 lxxxii  
 Suflex, Ltd, Greenford, Middx xxxiv  
 Uni-Gun Lubricating Equipment, Ltd, London, W 1 lxxix  
 Valves, Ltd, Coventry xxxvii  
 Vulcan Foundries, Ltd., Haifa cu  
 Watkin & Braham, London, S E 17 lxxii  
 Wego Condenser Co, Ltd, Greenford, Middx. li

**Timber, Wood, Plywood, Furniture**

F Austin (Leyton), Ltd, London, E 10 xi  
 Austin Veneer & Panel Co., Ltd, London, N 18 lxxxii  
 Luralda, Ltd, London, E C 3 lxxiv  
 Metal Products (Treforest) Ltd, Treforest Trading Estate, Glam xlvii  
 M A Morris, Ltd, London, N 16 xxix  
 B & I Nathan, Ltd, London, N 18 lxxvii  
 James H Pullin & Co., Ltd, Shoreham-by-Sea, Sussex lxix  
 J Summers & Sons (Furniture), Ltd, London, N 17 iii  
 Thames Plywood Mfrs, Ltd, Barking, Essex iv  
 Weisbaum Bros, Ltd, London, E C 2 liv

**Paper, Cardboard, Printers and Publishers, Drawing and Drawing Office Materials, Advertising Material, Toys, Dolls**

Jacob Beatus, Ltd, Porth, Glam xvi  
 Bennett Paper, Ltd, London, E C 4 xlii  
 Britannia Toy Co., Ltd, London, N 16 lxii  
 Chromoworks, Ltd, London, N W 10 xviii  
 Clear View, Ltd, London, N 8 l  
 Cecil Coleman, Ltd, London, N 1 xxxvi  
 Collins Arden Products, Ltd, London, W 1 lxxi  
 Conrad Press, Ltd, London, W 1 lxxviii  
 Cowan, de Groot, Ltd, London, E C 2 lxxii  
 J. Cowan (Dolls), Ltd, London, E C 2 xxiv  
 Paul Elek Publishers, Ltd, London, E C 1 lvii  
 Elkin & Margo, Ltd, London, E 1 x  
 Fancy & Crepe Paper Mills, Ltd, Gateshead-on-Tyne xii  
 Hollywood Publications, Ltd, London, W C 1 xlii  
 Mamelok Press, Ltd, London, W 1 xxvi  
 Marchant Manufacturing Co., Ltd, London, N 1 h  
 M Medney, Ltd, London, E C 4 lxxx  
 Max Moschkowitz, London, N 7 lxii  
 F J Munster & Co, Birmingham 18 xxi  
 Nig Manufacturing Co., Ltd, London, W C 1 lvii  
 C S Oserman, Ltd, London, E C 4 v  
 S Oppenheimer, Ltd, London, E C 2 lxxix  
 Park Royal Woodworkers, Ltd, London, N W 10 lxvii  
 A Saalheimer, London, E C 2 xxxviii  
 Santor Paper, Ltd., London, N W 1 lxxxix  
 Shapiro, Vallentine & Co, London, E 1 lxvii  
 J W Spear & Sons, Ltd, Brimsdown, Middx lxvi  
 Edmund Stekel, London, E C 2 lxxxv  
 Bernard Sternfeld Boxes, London, N W 1 lxxxiv  
 Team Valley Brush Co., Ltd, Gateshead, 11. Co Durham lxxxix  
 Tower Press Products, London, N 15 xl  
 Trux, Ltd, London, W 1 lxxxv  
 Raphael Tuck & Sons, Ltd, London, E C 2 xxxiv  
 Welsh Products, Ltd, Dowlais, South Wales lxvii

**Chemicals, Cosmetics, Pharmaceuticals, Paints, Cleansing Material**

Brit-Over, Ltd, London, E C 3 x  
 Chemical Building Products, Ltd, London, S W 1 lxix  
 Dytex Sales, Ltd., ("Tintex"), London, W 1. lxvi  
 Foundry Services, Ltd, Birmingham, 7 lxxv  
 Fubex, Ltd, London, W 1 viii  
 General Chemical Products Corporation of Palestine, Ltd., Tel-Aviv xcix  
 Gorney, Ltd, Manchester, 7 lxxxiv  
 Izhar Oil Industry of Palestine, Ltd., Tel Aviv xciv  
 Lankro Chemicals, Ltd, Manchester lxxxii  
 Marchon Products, Ltd, Whitehaven, Cumberland xx  
 Molcar, Ltd, London, E C 2 xxvi  
 Norgine Pharmaceutical Products (London), Ltd., London, W 1 lxxx

North London Metallising Co., Ltd., Enfield, Middx	xii
Olympic Varnish Co., Ltd., Enfield, Middx	xx
Palestine Frutarom, Ltd., Haifa	xciv
Palestine Potash, Ltd., London, W.1	xcv
Pharmaceutical Trust, Ltd., London, W.C.1	xxvii
Promedico Products, Ltd., London, N.4	xlvi
Shemen Works, Haifa	xciv
C. Tennant Sons & Co., Ltd., London, E.C.2	xcv
Tretol, Ltd., London, N.W.11	lxxvi
Warner, Harvey & Co., Ltd., London, W.1	vi
Victor Wolf, Ltd., Manchester, 11	xxxix
Zevah Oriental Paints Industry, Ltd., Haifa	xciii

**Food, Beverages, Liquors, Seeds, Tobacco**

Anglo Asiatic Co., Ltd. (Palestine Branch), Tel Aviv	ci
Appetiser Co., Ltd., North Shields	xxxviii
Assis, Palestine Fruit Products Co., Bejarano Bros., Ltd., Tel Aviv	c
Cabeer Breweries, Ltd., Bat-Yam	xciii
Citrus Products, Co., Ltd., London, N.W.1	lxxiv
L. Donath, London, E.C.3	xxvi
Elite, Palestine Chocolate & Sweets Manufacturing Co., Ramat Gan	xcix
Ch. Goldrei Foucard & Sons, Ltd., London, S.E.16	xxxix
Grand Moulins de Palestine, Ltd., Haifa	xcvi
S.F. & O. Hallgarten, London, E.C.3	xix
J. Horn, Ltd., London, W.C.1	v
Izhar Oil Industry of Palestine, Ltd., Tel Aviv	xciv
W. Kossoff (Juni), Ltd., London, E.1	lxxx
M. Kronenberg, London, N.W.6	xlvi
Mayer Brothers, Ltd., London, E.C.4	xviii
Mercantile Produce Co., Ltd., London, N.7	ii
Montclare & Co., London, W.1	lxii
Northern Food Products Co., Ltd., Newcastle-on-Tyne, 6	lxxii
O.P. Chocolate Specialities, Ltd., Merthyr Tydfil, South Wales	lxxviii
Palestine Brewery, Ltd., Rishon-le-Zion	xciii
Palestine Edible Products, Ltd., Haifa	xcv
Palestine Frutarom, Ltd., Haifa	xciv
Palestine Milling & Trading Co., Ltd., Haifa	xcv
Palestine Wine & Trading Co., Ltd., London, E.1	ci
Renbard Food Works, Ltd., Wembley, Middx.	lxvii
Savermo, Ltd., London, E.C.3	lxx
Shemen Works, Haifa	xciv
Simclair Casings & Leather, Ltd., London, S.E.1	xx
Sobrame, Ltd., London, E.C.1	liv
Société Coopérative des Grandes Caves de Rishon-le-Zion et Zicron Jacob, Ltd., Rishon-le-Tsion	xcvi
Sunmill Food Products, Ltd., London, N.1	lxxvi
Tnuva, Palestine	xcvii
Julius Trapow, London, N.W.6	li

**Im- and Export (General)**

Barnett Brothers, Newcastle-on-Tyne, 1	lxxxix
Brint Trading Co., Ltd., London, E.C.2	lxxi
Albert Cattin & Co., Manchester, 1	xlvi
Louis Cohen, Newcastle-on-Tyne, 1	xv
English Exporters (London), Ltd., London, W.1	xli
Isaac Haskel, Manchester, 2	lxxvii
Imextrade, Ltd., London, W.1	lxxiv
International Express Co., Ltd., London, W.1	xcix
Intex, Ltd., Tel Aviv	xcix
Iraco, Ltd., London, N.W.11	xlui
Manchester Industrial Products, Ltd., Manchester, 1	xii
D. Meyer, London, W.1	xv
Mira Trading Co., Ltd., Tel Aviv	cv
Isaac Modiano, Brother & Sons, Ltd., London, E.C.3	lvi

Molcarn, Ltd., London, E.C.2	xxvi
A & H. Otter, Ltd., London, E.C.1	xxvi
Supply & Transport Co., Haifa	xciii
Howard Webb, Ltd., London, S.W.1	cv

**Banks, Finance, Insurance, Transport**

Africa Palestine Investments, Ltd., Tel Aviv	xcvii
Anglo-Palestine Bank, Ltd., London, E.C.4, and Tel Aviv	xcii
A.P.B. Trust Co., Ltd., Tel Aviv	xcii
Anglo-Swiss Maritime Co., Ltd., London, E.C.3	x
Bizur, Ltd., Tel Aviv	cv
Colonial Mutual Life Assurance Society, Ltd., London, E.C.4	xlvi
Hasspeth Insurance Co. of Palestine, Ltd., Tel Aviv	cii
Judea Insurance Company, Ltd., Tel Aviv	xcv
Migdal Insurance Co., Ltd., Jerusalem	cv
Nir Agricultural Credit Institution, Ltd., Tel Aviv	xcix
Palestine Africa Bnyan Insurance Co., Ltd., Haifa	xcvii
Palestine Africa Shippers, Ltd., Johannesburg	xcvii
Palestine Jewish Colonization Association, Haifa	xcvi
South African Bnyan Mortgage Co., Ltd., Haifa	xcvii
Supply & Transport Co., Haifa	xciii
Zion Insurance Co., Ltd., Tel Aviv	xcv

**Miscellaneous**

Anglo Asiatic Co., Ltd. (Palestine Branch), Tel Aviv	ci
Bell & Frome, Ltd., Edgware, Middx	lx
British Institute of Engineering Technology, London, W.1 and Associated Institutes abroad	xc
Cahn & Bendit, Ltd., London, W.1	xlvi
Albert Cattin & Co., Manchester, 1	xlvi
Louis Cohen, Newcastle-on-Tyne, 1	xv
Collins Arden Products, Ltd., London, W.1	lxxi
Eden Hotel, Jerusalem	xciii
Elbief Co., Ltd., Birmingham, 18	l
Elkin & Margo, Ltd., London, E.1	x
General Building Materials "Hawak", Ltd., Hachlat Yehuda	cii
Hamashbir Hamerkazi, Palestine Co-operative Wholesale Society, Ltd., Tel Aviv	cii
Hamgaper, Ltd., Haifa	cu
Isaac Haskel, Manchester, 2	lxxvii
E. J. Herzfelder, Tel Aviv	cv
Highgate Optical Mfg Co., London, E.C.1	lxiii
Kharsah, Ceramics Works, Haifa	cii
Keith Prowse & Co., Ltd., London, W.1	lxiii
Max Kochmann, Ltd., London, N.W.6	v
Koor Industries & Crafts Co., Ltd., Haifa	cii
Levine & Son, Ltd., London, E.1	lvii
Manchester Industrial Products, Ltd., Manchester, 1	xii
Marks & Spencer, Ltd., London, W.1	lxxvii
Palestine Africa Unlthy Corporation, Ltd., Johannesburg	xcvii
Palestine Cold Storage and Supply Co., Ltd., Tel Aviv	xcvii
Palestine Electric Corporation, Ltd., Haifa	xcviii
Palestine Window Glass Works, "Phoenicia", Ltd., Haifa	cii
Plumridge's, London, W.2	l
Rasco Rural & Suburban Settlement Co., Ltd., Tel Aviv	xcv
Shapiro, Vallentine & Co., London, E.1	lxvii
Shermans Pools, Ltd., Cardiff	xiv
Solel Boneh, Ltd., Haifa	xcvii
Team Valley Brush Co., Ltd., Gateshead, 11, Co. Durham	lxxxix
Zurah Advertising, Tel Aviv	cvi

